

# Deeply Explore the Effective Application of Blockchain Technology in Differentiated Security Check

Yu Zhao

*Civil aviation university of China, TianJin 300300, China*

**ABSTRACT.** *Blockchain is a new application mode, which is based on the new technology derived from the era of computer Internet. It promotes a convenient and fast credit mechanism. When completing the information transaction, it does not need a third party to join, which greatly promotes the technological reform and industrial development. The integration of blockchain technology into differentiated security check can create a passenger chain with high trust, strong security and accurate data in other airports, and ultimately achieve the purpose of sharing airport passenger data resources. Under the influence of big data environment, using data mining technology to build passenger classification model, innovate passenger security steps, strengthen security, improve security operation rate, and provide high-quality security services for many passengers. Based on the application of blockchain technology in differentiated security check, this paper puts more construction ideas into airport security check, so as to speed up airport security check.*

**KEYWORDS:** *Blockchain technology, Differentiated security, Application*

## 1. Development Background of Blockchain Technology

Surrounded by the development of the steam engine and the Internet, the blockchain technology has evolved and become an important technology with a subversive nature. The most prominent revolutionary feature of this technology is the conversion of the ancient lagging credit mechanism into a method that can be quantified through technical means. There are many characteristics of blockchain technology, the most common ones are strong security performance, transparency, and cannot be modified at will.

Alliance chains, private chains, and public chains are important components of blockchain technology. Among them, the alliance chain joining rules only allow members to join, and the read and write permissions and participation accounting permissions in the blockchain must be established according to their rules. Private chain: Based on the internal environment of the enterprise, it is determined according to the needs of the enterprise in setting up system operation standards. Public chain: There is no official organization, management mechanism, and central server. Participating nodes usually enter the network by themselves according to the system pattern, and will not be constrained. The consensus mechanism promotes the operation between nodes. The network connection is usually connected to the gateway node of the member institution. In terms of data access, it must be a member and user of the alliance institution to query [1].

## 2. Recent Situation of Civil Aviation Security Inspection

In recent years, the airport security inspection process and ideas have been systematically upgraded and improved. From a safety perspective, the service characteristics, safety level and operating efficiency of security inspection management should be fully considered. On the basis of ensuring safety, strengthen the safety operation efficiency and innovate safety service experience steps, so as to meet the innovative requirements of civil aviation security reform.

Under the spur of new concepts, the Civil Aviation Administration has added differentiated security check and new policy research sites in various regions to reasonably distinguish passenger integrity and divide them into high-risk passengers, ordinary passengers, and low-risk passengers according to the level of passenger risk. In the rugby-style deployment framework, only a few passengers have high risk factors. For this, secondary screening can be implemented through corresponding technology and manpower to ensure that the remaining passengers can have a quick and convenient inspection procedure and inspection experience. First, it highlights the safety and service characteristics, and secondly, it allocates resources scientifically to avoid waste and enhance the efficiency of security inspection operations [2].

In the later period, the airport can delve into relevant data in depth, grasp passengers' integrity information in advance, and scientifically deploy passageways, facilities, and manpower. According to the differentiated integrity status, security inspection channels for passengers to walk alone will be arranged. Currently, security inspection equipment has been comprehensively upgraded and improved, and most passengers will enjoy a large number of non-contact and comfortable security inspection processes. Due to technological innovation and process adjustments, security screening will not be the most difficult hub in the journey phase, but will be converted into a coexistence window of security services, highlighting the advantages of airport intelligence and service.

### **3. Effective Application of Blockchain Technology in Differentiated Security Inspection**

Some airports in China have a comprehensive and in-depth understanding of differentiated security. For example, VIP passengers are assigned to express security channels, ordinary passengers are assigned to reserved channels, and other non-small baggage security inspection sites are added. This differentiated security inspection method mainly focuses on services, and never considers safety and traffic efficiency issues. The fundamental reason is that the amount of airport data is small and the data source is monotonous. Based on this, a classification model specifically for passengers can be constructed.

#### **3.1 Data Sharing**

In order to get closer to the differentiated security inspection, and consider it as soon as possible, the airport must realize the sharing of passenger data resources, and the passenger integrity classification model created must obtain industry permission, and at the same time publish passenger integrity levels on the industry platform. It can be seen that data sharing plays a key role in the entire system.

For data sharing in the past, the passenger data information of other institutions was collected and saved, and then entered into the central database, so as to obtain the passenger's integrity classification, and share the information data to the airport information database. From a security perspective, it is difficult for an organization to store data in a designated center, so they once questioned the reliability of the central organization's data [3].

#### **3.2 Blockchain is the Best Data Sharing Technology for Differentiated Security Inspection**

In recent years, Sita and IATA have successively launched a white paper on the application of blockchain, which is popular in the field of civil aviation, confirming the application value of blockchain technology in the field of civil aviation. For example, Sita laboratory, Heathrow airport and International Aviation Group have jointly defined the blockchain research project of air transport industry as the flight chain.

IATA and commercial aviation work together to build a travel grid based on the blockchain platform, and promote applications in many fields, such as identity recognition, point application, luggage tracking, retail payment, etc.

Using blockchain technology to deal with the sharing of civil aviation passenger credit data resources, its specific advantages are mainly reflected in the following aspects:

**Shared ledger:** Issue an encrypted immutable transaction ledger, as long as the participants can query the classified account data, and complete the data sharing to ensure the uniformity of the classified account data.

**Unchangeable:** When the two parties no longer trust each other, compared with the centralized or distributed database alliance chain, the advantages are outstanding. The data provided by both sides and the processed data are shared on the ledger, and each party cannot change at will to guarantee the data reliability.

**Access authentication:** The alliance blockchain generally refers to the blockchain controlled by the pre-selected nodes in the consensus stage. Both the authentication authority and the read and write authority guarantee the authenticity of the data.

The use of this technology can further improve data security and achieve sharing purposes. It is convenient for multiple airports and airlines to query different passenger information and provide multi-dimensional passenger credit information for airports. According to the credit data can complete the differentiated security inspection work, gradually improve the security, at the same time, let passengers feel the efficiency.

## **4. Blockchain Technology Establishes Differentiated Security Inspection Ideas**

### **4.1 Adding a Passenger Chain**

Combined with the current social situation, the passenger chain needs to be converted into an alliance chain to facilitate the deposit of passenger information. In order to make the passenger data dimension more fulfilling, the passenger link should be connected to the airport information and then linked to third-party data, such as social platforms and e-commerce platforms<sup>[4]</sup>.

**Distributed ledger construction:** Participants each keep a passenger data blockchain, which stores information on passengers' integrity. Set a certain point as a gateway, verify the passenger chain block in detail, and scientifically configure data permissions.

**Smart contract:** Regularly maintain the blockchain data program, which runs at different airport nodes, confirming that the data and logic processing of all nodes in the network are consistent, and there is no special case. Passenger behavior data appearing at the airport will be checked and processed using smart contracts and unified logic standards, and finally filled in the account book.

**Incentive mechanism:** Encourage airports and airlines to search for more useful data information in the passenger chain, and choose an incentive mechanism, such as recommending institutions with high data value to experience the blockchain platform service.

### **4.2 Construction of Passenger Differential Classification Model**

On the one hand, clear business goals. Establish a differentiated passenger classification model, fill in passenger integrity information, and divide them into high-risk passengers, ordinary passengers, and low-risk passengers according to the level of passenger risk.

On the other hand, create a passenger credit portrait. Confirm the identity of each passenger and mark his ID number as the passenger identification; then, based on the big data environment, reflect the characteristics of user information labeling, thereby completing multi-dimensional portraits.

### **4.3 Benefits of Differentiated Security Inspection**

**Social benefits:** Once passengers have dishonest behaviors, they will have a serious impact on their security level and travel conditions. In this regard, society should attach great importance to the issue of integrity. Everyone should strictly control their own behaviors, improve their integrity, and promote the harmonious development of society.

**Safety benefits:** Differentiated security screening can search for passengers carrying contraband in advance, focus safety resources on passengers, ensure the safety of passengers' lives, strengthen the fairness of the industry, and strongly promote the sustainable development of the industry

**Economic benefits:** Converging equipment and manpower into high-risk channels, not decentralized, use security inspection resources scientifically and save costs.

## **5. Conclusion**

In summary, with the large-scale application of blockchain technology, the airport reform process has been greatly accelerated. Starting with this technology, it has laid the foundation for creating a safe, efficient and high-quality modern aviation. Based on the premise of blockchain technology, it enhances industry safety and operation quality, meets different airport requirements, ensures aviation safety, and realizes the strategic goal of a strong country.

## **References**

- [1] Wang Shu, Jiang Nan, Kang Shigong (2017). Development and Prospect of Blockchain Technology [J]. Computer Knowledge and Technology, no.23, pp.288-289.

- [2] Wang Tianshan, Yang Jian, Wang Yao (2018). The Application of Blockchain Technology in the Field of Civil Aviation [J]. *Information Technology and Network Security*, no.11, pp.113-116.
- [3] Zhai Sheping, Li Zhaozhao, Duan Hongyu, et al (2018). Research on Data Consistency in Key Blockchain Technologies [J]. *Computer Technology and Development*, no.9, pp.94-100.
- [4] Wang Hongye (2019). Research on Air-rail Combined Ticketing Model Based on Blockchain Technology [J]. *Railway Transport and Economy*, no.11, pp.33-34.