Optimization Design of Cross-Border E-commerce Shopping Guide System Combining Big Data and AI Technology

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Abstract. In the era of Internet economy, cross-border e-commerce shopping guides were conducted under the conditions of virtual network environment. Therefore, the traditional cross-border e-commerce shopping guide system had long been unable to meet the diversified needs of cross-border e-commerce shopping guides. A cross-border e-commerce shopping guide system combining big data and AI technology was proposed and designed. Using big data and AI technology, the hardware and software of the cross-border e-commerce shopping guide system were analyzed respectively, and the optimized design of the cross-border e-commerce shopping guide system was completed. The experimental data showed that the cross-border e-commerce shopping guide system combining big data and AI technology had better performance than the traditional system, and could better meet the technical requirements of cross-border e-commerce shopping guide.

Keywords: Big data · AI technology · Cross-border · E-commerce shopping guide system · Optimized design

1 Introduction

In order to promote the development of the national economy, the import trade industry is developing rapidly. Free trade zones have been established in China, the first time in the Shanghai region. Practice shows that the establishment and development of free trade zones are the important way to promote economic development at home and abroad [1]. Simply, it is to explore and establish a new market economy suitable for China's national conditions. The main core contents of the free trade pilot zone include further clarifying the role of the government in market economic activities, comprehensive reform of the existing financial system, and promotion of the development model of new trade models. China's free trade pilot zone does not copy foreign trade zones, but combines the new situation of international trade with China's economic development requirements, and establishes an economic model with Chinese characteristics that can sustainably guarantee the rapid growth of China's economy [2]. As consumers have huge consumer demand for overseas goods, the advantages of the free trade zone in bonded import will undoubtedly greatly change the consumption habits of

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existing users. The establishment of a large-scale cross-border e-commerce integrated service platform on the business model of the Pilot Free Trade Zone can also solve the problem of foreign brand retail goods entering China through online platforms [3]. With the help of the policy opportunities of the free trade pilot zone to promote the construction of cross-border e-commerce platforms, we can first change the current chaos of the cross-border e-commerce shopping guide "cross-border online shopping" model, and regulate the behavior of the entire cross-border e-commerce shopping guide industry. Secondly, it can also solve the problems of after-sales service, goods return, temporary commodity taxation and payment risk that have long plagued cross-border e-commerce industry in the past, paving the way for the rapid development of cross-border e-commerce shopping guide [4].

2 Optimization Design of Cross-Border E-commerce Shopping Guide Hardware System Combining Big Data and AI Technology

At present, in the cross-border e-commerce shopping guide operators, the two most important problems in cross-border supply chain management are the operation mode and logistics operation system of overseas suppliers [5]. For overseas suppliers, cross-border B2C e-commerce platform are relatively smooth development in most areas, but in the investment and business introduction this link is relatively weak: some regional well-known brands have no willingness to enter the Chinese market due to their limited production capacity; For some internationally renowned brands, expanding the cross-border e-commerce shopping guide retail channel is likely to create a conflict of interest with the costly establishment of international agents and channels. If high-quality investment is not possible, the cross-border e-commerce shopping guide platform will not be able to effectively control the quality of overseas goods. The phenomenon of shoddy, counterfeit and shoddy caused by secondary times will cause a fatal credibility crisis for the e-commerce platform and the entire cross-border e-commerce shopping guide industry (Fig. 1).

In terms of cross-border logistics implementation, there are currently two main problems: the first is the cross-border circulation speed of goods, and the second is the customs clearance optimization ability of goods [1]. At present, small parcels for cross-border e-commerce shopping guides mainly rely on transshipment companies to complete cross-border logistics through transshipment companies. It will inevitably lead to the break of the supply chain "three streams in one" ("flow of funds", "information flow" and "material flow" in e-commerce), which will cause significant obstacles to the speed of cargo flow [6]. However, the ability to optimize customs clearance is mainly determined by the number of customs duties and the clearance time. Once the customs clearance time is longer or the tariff changes greatly, it will greatly affect the customer experience of e-commerce consumers, and affect the reputation and promotion of cross-border e-commerce brands.

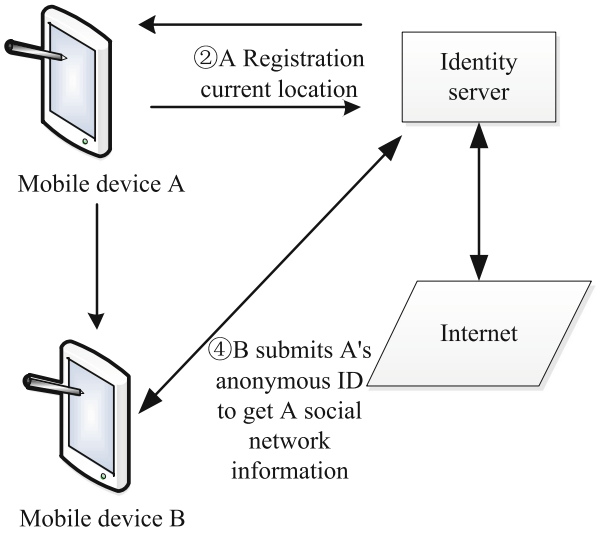

Fig. 1. Cross-border supply chain

3 Optimization Design of Cross-Border E-commerce Shopping Guide Software System Combining Big Data and AI Technology

In the framework of constructing a unified customs service platform, the General Administration of Customs takes the lead in taking the lead. Therefore, the internal system of the Customs Administration can directly communicate with the data of the platform, and the customs clearance of goods is regulated by means of "three-in-one comparison". "Three orders" refers to the customs declaration form provided by the e-commerce enterprise, the payment list provided by the payment enterprise, and the logistics operation note provided by the logistics enterprise [7]. After the "three singles" data is confirmed, it can be released, thus saving customs clearance time and improving customs clearance efficiency.

Through a unified customs clearance service platform, it is possible to provide a simpler and more effective supervision method for the General Administration of Customs and local customs, and assist the supervision department to effectively cope with the current fragmentation trend of foreign trade orders [8]. By comparing enterprise data and customs data, it can effectively cope with the small number of small parcels and small orders, and improve the efficiency of customs clearance while reducing the burden of customs supervision.

3.1 Public Service Construction Management with Big Data Technology

The construction of cross-border e-commerce public services in the free trade zone, the meaning of this "public service" has two-way. Firstly, it builds a public information platform between the functional departments of local governments, and then, Its main

service object is the public subject, which mainly refers to the public subject in the field of foreign trade. Sunshine trade links are numerous, involving national inspection (inspection and quarantine), national tax (tax refund), SAFE (payment settlement), traditional foreign trade enterprises need to be one-on-one with government commissions or foreign trade and economic commissions (enterprise filing, data statistics) and other government functions and banks. Cross-border e-commerce industry due to the particularity of its fragmented orders, such as repeated orders with the functional departments for each order will become extremely arduous work. In addition, government functions also need a public area to share data uploaded by enterprises, and data collection, exchange comparison, supervision and other work.. The system framework is shown in Fig. 2:

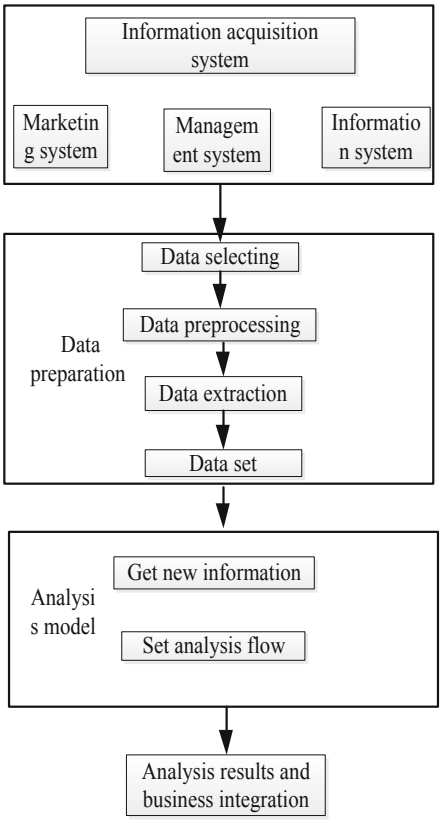

Fig. 2. Official service platform framework

Therefore, the public service platform invested by the government has become the fundamental means to solve these problems. As with the customs clearance service platform, the local public service platform also generally adopts the "three-single comparison" approach for supervision. The "three-single" formalities are complete and

supervised and approved, so that they can enjoy the normal foreign exchange tax rebate. The cross-border e-commerce public service platform serves as a platform for government-level construction. In addition to communicating with government functions, some local platforms can directly interface with customs clearance service platforms. The public service platform not only forms a circle of intersections between various government departments(National Inspection Bureau, State Administration of Taxation, SAFE, Foreign Trade and Economic Cooperation Commission, Commercial Committee, Economic and Information Commission, etc.), but also builds a bridge of communication between relevant government functions and foreign trade. It is a service window opened by the functional department for foreign trade enterprises, which can effectively promote the sharing of resources, efficient operation, unified collaboration and innovative services.

3.2 Artificial Intelligence Algorithm

A cross-border e-commerce integrated service platform built by large-scale cross-border e-commerce enterprises provides agency services for these small and medium-sized enterprises and individual sellers. As the country's cross-border e-commerce regulatory policies become clearer, customs and governments around the country are gradually tightening the regulatory gap. Some traditional small and medium-sized foreign trade enterprises and cross-border e-commerce platform individual sellers have gradually developed an uncomfortable and urgency in the face of emerging regulatory policies. This part of the foreign trade unit has a common feature. It has long been used for postal transportation, and it is not taxable. It is not familiar enough with the sunny cross-border chain, and it seems to be at a loss in the face of the era of e-commerce supervision. The competent government department shall promote the internationalization of the mature e-commerce integrated service platform in China, as shown in Fig. 3.

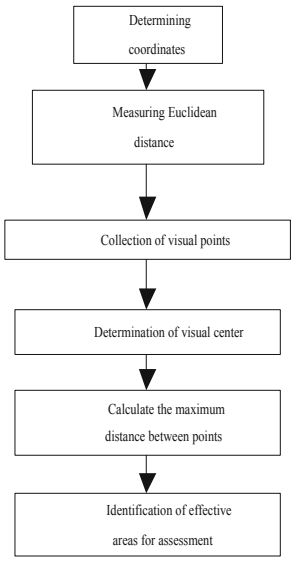

Fig. 3. Integrated service flow chart

Some large cross-border e-commerce companies have extensive experience in dealing with problems arising from cross-border e-commerce chain links in government and customs departments. These large-scale cross-border e-commerce companies can establish a bridge between foreign trade enterprises and consumers, providing agency services for sellers, including finance, customs clearance, logistics, tax rebates, foreign exchange and other aspects. The cross-border e-commerce integrated service platform provides convenient solutions for related enterprises in reducing foreign trade thresholds, dealing with foreign trade issues, and reducing foreign trade risks. At present, such platforms are suitable for a variety of formats such as small parcels and small orders, and will also develop deeper and more professional services with the development of cross-border e-commerce, as shown in Table 1.

Table 1. Characteristics of electronic target procurement service.

	P1	P2	P3	P4	P5
Cube	3.21	0.23	5.61	6.72	7.45
Triangular prism	3.42	0.41	5.12	6.21	7.82
Globe	3.64	0.72	6.26	5.27	7.31

For any of the target highlights, five different eigenvalues $P\{P1, P2, P3, P4, P5\}$ can be extracted, then the membership functions are:

$$P(X)\sum = \xi e \sum_{C}^{W} L \tag{1}$$

Where

$$P = |P1{-}M1| \cdot |P2{-}M2| \cdot |P3{-}M3| \cdot |P4{-}M4| \cdot |P5{-}M6| \tag{2}$$

Based on this formula, the membership functions are:

$$U = \{U1(P1), U2(P2), U3(P3), U4(P4), U5(P5)\} \tag{3}$$

4 Experimental Results and Analysis

In order to ensure the absolute design of the cross-border e-commerce shopping guide system optimization design combining big data and AI technology, the experimental demonstration was carried out. In the experiment, the traditional cross-border e-commerce shopping guide system and the system optimization designed in this paper were compared and tested to observe the difference and record the data at any time. The schematic diagram of the experimental demonstration results is shown in Table 2 and Fig. 4.

Table 2. Test parameters.

Name	parameter values
Network size	300 × 300
Number of nodes	200 and 300
Communication radius (m)	32
Base station position	(0,0)
Eelec(nJ/b)	50
Eda(nJ/b)	5
Packet size (bits)	1000
Initial energy (J)	2
α	2
β	1
γ	0.5

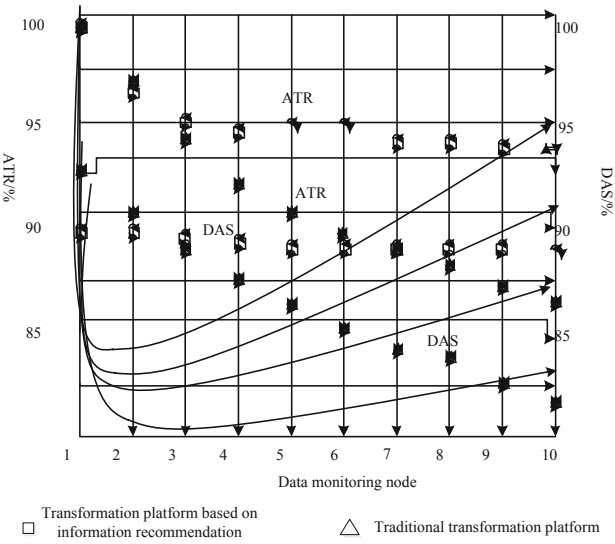

Fig. 4. Experimental comparison chart

Through experimental comparison, we can find that in the case of the same data node, the system optimization under the support of big data and artificial intelligence is outstanding in ATR (Customer Terminal Performance) compared to the original system method. It also performs well in DAS (the desire to purchase goods), which is much higher than the original system design. Thereby changing the order picking mode of the e-commerce logistics distribution center, and improving the accuracy and efficiency of order picking.

5 Conclusions

This paper mainly studies the optimization design of cross-border e-commerce shopping guide system combining big data and AI technology. It can use big data and AI technology to effectively obtain information from it and identify the target to help us obtain more valuable cross-border e-commerce shopping guide information. It develops and utilizes cross-border e-commerce shopping guides to enhance valuable information resources.

Through the discussion and analysis of this paper, we can understand that the research on the optimization design of cross-border e-commerce shopping guide system combining big data and AI technology has important and far-reaching significance. Although the design of cross-border e-commerce shopping guide system has achieved great gains in recent years, there are still many problems waiting for us to solve. To this end, we must not be afraid of difficulties, overcome difficulties, and constantly optimize the design technology of cross-border e-commerce shopping guide system combining low-resolution big data and AI technology to obtain effective information. In turn, it will better serve China's cross-border e-commerce shopping guide business.

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