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Research on the Application of Computer Network Technology in Electronic Information Engineering

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Abstract: Computer network technology has a very important role in electronic information engineering. The application of this technology not only enriches the traditional information engineering functions, but also effectively guarantees the efficiency and quality. At present, due to the wide variety of external information that Chinese citizens are exposed to, in addition to the variegated and mixed content, it is easy for information to be leaked or stolen. In order to avoid similar situations, it is necessary for people to pay more attention to network system security, so as to ensure that the quality of life of citizens can be guaranteed. In view of that, this paper discusses and analyzes the application of computer network technology in electronic information engineering.

Keywords: Computer network technology; Electronic information engineering; Application and management

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1. Overview of computer network technology and electronic information engineering

1.1. Computer network technology

Up to now, topological structure is the main content in China's computer network. Compared with other structural types, this kind of structure is externally described and expressed through the combination of communication lines and nodes, so as to complete the subsequent network application work. In terms of structural forms, needles, and wires that can be used to substantiate network structural relations to a certain extent, there are generally five types: star structure, ring structure, tree structure, network structure, and bus structure [1]. Among them, star structure is more widely used, and the market prospect is relatively optimistic. It uses centralized communication control to carry out management work. Computers in any area must be connected to the central system through the application of a star coupler to complete the corresponding connection work. Compared with other techniques, the star structure can effectively reduce failures. Even if a stage fault occurs, other first-level computer devices will not be adversely affected in view of the parallel connection. Meanwhile, the fault can be detected and addressed right away, thus laying a solid technical foundation for follow-up work [2].

1.2. Electronic information engineering

From a macro point of view, the application scope of electronic information engineering is relatively broad, and the content is extremely complex, including a great deal of system management content, such as data collection work, information high-speed processing work, and electronic information system application, among other things. Since electronic information engineering itself is relatively complex in the application of disciplines, closely related with other disciplines, and more stringent in terms of professional

requirements, the application of electronic information engineering will be influenced by external factors if a personnel's comprehensive quality cannot be effectively guaranteed, resulting in insecurity of a project's quality [3]. In order to prevent this situation, relevant enterprises need to effectively combine it with computer network technology in the application process of electronic information engineering, in order to ensure that the development of electronic information industry is not affected and secure the development of processing, so as to lay a solid foundation for China's information construction.

2. Characteristics of electronic information engineering

2.1. High convenience

In the running state, electronic information engineering involves information processing, and the whole process is closely related to the computer system and hardware equipment. Affected by the lag in the system, it is difficult to carry out effective means of processing massive information with traditional information technology, thus follow-up work cannot be carried out smoothly. In order to avoid similar situations, it is necessary to select more advanced electronic information engineering technology and use cloud technology to carry out mass processing of information. In this way, not only the efficiency of information processing can be effectively improved, but also the reliability can be guaranteed [4]. Compared with information processing methods used before, advanced electronic information engineering technology has greater advantage in terms of efficiency, and its processing speed can also reach the expected standard, which not only promotes the change in traditional information processing methods that have various restrictions, but also meets the needs of China's social development. Nowadays, enterprises in China are actively opting for advanced and effective electronic information engineering in the application process, which not only effectively improves the application efficiency of information processing technology, but also lays a good theoretical foundation for China's social development. Information processing can be completed via the operation of software on the computer system [5].

2.2. Extensive coverage

At present, with the continuous development of the society, people are more dependent on information. Under this background, it is difficult for traditional information technology to be effectively developed, which will not only result in the inability of information content to be effectively processed, but also affect business and personal applications. In contrast, advanced electronic information engineering breaks the limitation of existing space and expands the functional performance range of technology, which will not only effectively improve the efficiency of information processing, but also guarantee the quality of application. From the perspective of coverage, all industries in China will be affected by electronic information engineering, which covers a wide range and is also an indispensable and important part of China's modernization construction. In the context of the new era, the emergence of 5G technology has laid a good foundation for the development of China's information technology and created a relatively complete living and working environment for the people, whether individuals or subjects, who are becoming increasingly reliant on the application of information resources. Under this trend, handling information resources at a high level has become an important guarantee for determining the quality of social development. In other words, the role of electronic information engineering in China's social development will become increasingly important. For enterprises, if they choose not to apply electronic information engineering or continue to uphold traditional information management methods, not only their market competitiveness will suffer, but so will their economic development and sustainable development strategy needs [6-8].

3. Specific application of computer network technology in electronic information engineering

3.1. Information transmission

Information transmission can be said to be the reflection of human civilization. With the continuous development of the era, varying degrees of change can occur in the process of information transmission, especially under the influence of information technology, followed by the people themselves or the development of life, with living conditions beginning to present trends of diversification. In the process of acquiring information, people can choose different kinds of channels. If the analysis is carried out from the perspective of the carrier, whether it is learning, life, or even in the field of social production, all information will involve the existence of the carrier. The processing ability of traditional information technology is relatively poor, which easily causes problems to varying degrees in the process of information transmission. In order to avoid similar situations, relevant enterprises must choose computer networks and technologies, as well as use the characteristics of the times and technological advancement to improve information processing efficiency, and at the same time, to ensure that the quality of information transmission will not be affected by external factors [9] .

In the 21st century, the manufacturing industry will face a more challenging issue. A large amount of information data will be generated in the production and operation state. These data themselves are repetitive, complex, and unstable. In the process, the frequency of interaction is relatively high. If WAN is used for operation, it will not only lead to a substantial increase in expenditure and an ineffective guarantee of economic development, but also a certain impact on China's informatization construction. Through the application of computer network technology and effective control of the local area network, the negative effects of external factors can be reduced, and the quality of information transmission can be effectively guaranteed [10-12].

If the enterprise itself has a relatively large-scale operation, it will involve the subordinate processing of relevant branch structure. In order to ensure that the quality of internal information transmission meets relevant standards, it is natural to manage data and information based on the actual situation, so as to ensure that important files can be transferred in real time. In this process, enterprises need to lay out the lines according to the location, so as to ensure that the information can be smoothly transmitted to the branches without being limited by time and space, which will not only effectively improve production efficiency, but also bring a positive effect in promoting enterprise and social development [13-15] .

3.2. Electronic communication engineering

Through the application of computer network technology, the transmission quality of electronic information data can be improved. As an important part of electronic communication engineering, the existence of this technology has high practical significance. With the continuous development of the times, information technology has become the mainstream trend, and it is closely related to the quality of life and work content of the people. Under this background, the living conditions of the people have also undergone fundamental changes. As an indispensable part of information engineering, electronic engineering has an important role for social construction and development in China, and computer network technology can simplify the working mode of information processing, the information transmission process of fault frequency, and the efficiency of optimizing management, which will not only effectively improve the security and stability of the operation, but also lay a solid technical foundation for China's informatization construction [16-19].

Today, the communication between people has changed. Due to the influence of electronic communication engineering, there is no need to face the obstacles of space and time. Video and voice calls can be carried out by using mobile information terminals. Milestone performance is the basis for the development of the industry. Communication engineering has a very close relationship with China's social development. For this reason, enterprises should cooperate with various departments to optimize

communication projects, emphasizing the application and analysis of current technology, which will not only meet the needs of national life, but also bring a positive impact on the development and construction of human civilization [20].

3.3. Realize resource exchange and sharing of electronic information system

Through the application of computer network technology, the interoperability of relevant electronic engineering information resources will also improve, and relevant standards will be met in terms of sharing capabilities. In this context, staff can use network protocols to carry out compilation operations, which will not only improve the efficiency of information processing as well as strengthen the quality and security of transmission, but also prevent national information leakage, which will adversely affect their own interests. Not only that, with network protocol, it is possible to strengthen the analysis of the network structure, clarify the corresponding content of different interfaces, and carry out layered architecture work in line with the actual situation, so as to meet the operational needs of the information database. It can be seen that the application of computer network technology can effectively improve the operation quality of data and information resources, realize interoperability and sharing, as well as promote the quality of life of citizens and social development.

4. Conclusion

In conclusion, computer network technology is a product of the information era, a necessary part of the development of human society, and plays an extremely important role in social construction. The application of computer network technology in electronic information engineering can improve the security, diversity, and systematicness of a project, which will not only realize the stable application of the system, but also guarantee the economic development at the social level. However, from the current point of view, there are still several issues in the application of computer network technology in China, making it a challenge to guaranteeing the quality of information processing and affecting the management of information technology projects to a certain extent. Hence, it is necessary for enterprises and personnel in China to carry out more in-depth innovation and research in this field.

Disclosure statement

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Research on the Utilization and Optimal Management of Electronic Information Resources in University Libraries

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Abstract: Through theoretical analysis, this paper expounds the value of strengthening the utilization of electronic information in university libraries and the reasons affecting the utilization rate of information resources in electronic libraries, so as to give better play to the role of university libraries and improve the utilization rate of electronic information in university libraries. In view of the existing problems, this paper puts forward measures to optimize the utilization rate of electronic information resources in university libraries and give full play to the role of electronic information resources, so as to promote information exchange and development.

Keywords: University library; Electronic information; Resource utilization

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1. Introduction

The university library is an important place for students to obtain information. With the improvement of information technology and digitization, university libraries have developed from traditional paper libraries to digitization and electronization. With their improvement in electronic information technology, the convenience of information exchange has increased significantly. Students can also make better use of electronic information resources and build a self-awareness system. However, there are still some problems in the development of the utilization of information resources in university libraries, and there are still several limitations in the safety and rational utilization of electronic information resources in university libraries. How to achieve a breakthrough in the constraints of the utilization of electronic information in university libraries and abate the defects in the utilization of electronic information resources in university libraries is an issue that requires attention in the development of information technology in university libraries.

2. Role of university libraries in the development and utilization of electronic resources

2.1. Assist libraries in adapting to the new nature of information retrieval in the network era

With the advent of the internet era, the public's awareness of information resources has improved. On the one hand, the acquisition scope of various short video platforms, social media, and other information resources has been expanding, but on the other hand, it is tied to people's usage patterns. The development of electronic information in libraries and the change of reading methods require libraries to gradually adapt to the new information environment. Generally speaking, in the new era of economic development and fast

changing lives, people are more interested in reading electronic information in a short period of time, including news, entertainment activities, or literary journals [1]. In this case, people have gradually developed the habit of reading and remembering at any moment. This serves as a reminder to libraries to consider the four characteristics of students while developing and utilizing electronic information resources. They should not put additional pressure on students to read or search for information resources. From the perspective of the traditional way of reading, the bookshelf has value in the traditional way of reading resources [2]. Compared with network resources, physical book resources still have clear benefits. Therefore, in order to develop electronic information resources, libraries must also analyze the advantages of electronic information resources as well as optimize and integrate their electronic information resources based on information retrieval characteristics in the network era with the actual qualities of the school's specialization.

2.2. Provide access to resources for all teachers and students

The advantage of the development and utilization of electronic information resources lies not only in convenience, but also in the content. Students or other borrowers can acquire more learning channels through electronic information resources in libraries, so as to save time. People can even explore the value of their learning resources to some extent, while saving time. In the internet era, the use of electronic information resources in libraries has heightened, and students have more opportunities to gain knowledge. However, learning resources can be found everywhere on the network; hence, the difficulty in distinguishing between true and false arises, with some highly sensitive information [3]. In some sensitive occasions, the official platform will mask some keywords to protect against false information; however, the effect is subtle. Compared with hybrid network resources, electronic information resources in university libraries have higher reliability. Some electronic information resources are only added to the electronic information resources system after strict review. The requirements for subsequent screening and evaluation are also relatively high. This provides a broader and more effective way for students to read electronic information resources as well as allows schools to manage these resources more effectively. For the sake of campus resource security, colleges and universities tend to tighten the restrictions on login ID. Some libraries only allow users to log in when they are connected to the campus network, but this is not the case for all. The security restrictions of schools affect the students' experience of using electronic resources to a great extent.

2.3. Highlight the academic value of electronic information resources in libraries

When university students borrow electronic information resources from libraries, they often have very distinct purpose, such as for completing their assigned homework, preparing for school competitions, and so on. From the perspective of the academic value of electronic information resources, universities should provide cutting-edge academic research papers through the development and utilization of electronic information resources and network platform, so that students can read and learn from them [4]. Students can improve the quality of these electronic information resources and highlight the academic value of electronic information resources by creating an internal map. When studying these electronic information resources, students should focus more on the creation and innovation of literary resources, such as journals and papers, under the guidance of teachers, so as to gain new and valuable academic research perspectives. In view of their cognitive capabilities and the accumulation of life experiences, students may not be able to effectively understand some information from these resources, but under repeated action over a period of time, students will come to understand the theoretical or literary nature of learning. Understanding and developing good thinking and cognitive habits are extremely important for future studies and life itself.

3. Reasons for the lack of effective utilization of electronic information resources in university libraries

The main reasons for the lack of effective utilization of information resources today include poor public relations, strong network dependence, slow update speed, weak search function, weak consulting service ability, etc. [5-10]. A higher resource utilization rate is required for information development, but there are still many issues in the current utilization of information resources in university libraries.

3.1. Lack of publicity

At present, the major libraries in universities often perform their respective functions, and they generally lack effective coordination and cooperation. At present, they have poor public relations, and essential individuals are not given proper training. As a result, people are unable to fully comprehend the importance of electronic information resources to the development of libraries, the contents and methods of information education in most university libraries are outdated, and readers lack sufficient understanding of the contents of electronic information resources [11]. The lack of clarity about the types and functions of information resources in libraries hinders the development of readers' interest and academic research. Libraries seldom conduct courses on the use of electronic information resources; in addition, the public relations service that assists people in understanding, selecting, and using electronic information resources is lacking.

3.2. Strong network dependence

At present, the utilization of electronic information resources is affected and limited by the network environment, computer, and hardware facilities. Among them, information query and information retrieval often involve a large amount of information. Channel congestion may occur and the query effect will be affected if the network bandwidth is insufficient [12]. In addition, for colleges and universities that do not have sufficient network coverage over the whole campus, especially non-colleges and universities, scientific research places, and campuses, the inability to connect to the campus network will directly affect the use of electronic information resources. The efficiency of their utilization is facing a serious impact; hence, special attention should be paid to universities.

3.3. Slow update speed and weak search function

For current electronic information resources, various search methods have been designed to meet the needs of readers. In some cases, simple language is used to realize simple and intelligent search, but readers still need to have an in-depth understanding of electronic information and the use of the information resource retrieval system. At present, the update speed of various electronic information resources is slow, and the search methods are not integrated. Most readers tend to struggle since they do not fully understand all search interfaces and search functions [13]. It is one of the major variables influencing the research on electronic resources in colleges and universities.

4. Ways to optimize the utilization of electronic resources in university libraries

4.1. Develop information promotion channels for electronic libraries

Various new media are constantly emerging, and the promotion of electronic resources cannot be restricted to the scope of libraries. While maintaining the traditional public relations platform of libraries, the learning environment and venue of universities can be used to hold announcements, hang posters, and conduct lectures, while carrying out online courses to enhance students' understanding of electronic resources. It is important to attract students' attention and interest as well as guide them to deeply realize that they are huge potential users of electronic resources [14-16]. At the same time, offline publicity and promotion can be carried out in the form of exquisite user manuals and publicity manuals. In addition, qualified colleges and

universities should begin offerring elective courses related to literature retrieval to provide students with comprehensive and systematic electronic resource education.

4.2. Strengthen the training and management of university library managers in information technology

University libraries are in charge of upgrading and transforming electronic services. In the process of digital transformation and intelligent transformation, there is a need to train and improve the service content as traditional library managers are not able to adapt to the new service management mode. The management of library personnel can be carried out in the following ways: first, recruit more staff who can adapt to intelligent library services, conduct necessary operation training for staff before taking office, and encourage each staff to improve and upgrade their skills by means of lectures or further studies, so as to meet the needs of electronic upgrading and transformation of university libraries as well as to be able to use relevant intelligent library equipment, so that when any equipment fails, it can be solved independently; second, strengthen the improvement of their own skills; in addition to training new recruits, it is necessary to strengthen the training of existing staff in order to help them enhance their skills; library staff should master a certain foreign language level and basic knowledge as well as to be able to provide users with timely and rapid solutions when encountering problems, so as to meet the diversified service objects and service types of libraries [17]; third, library managers and leaders need to strengthen their sense of progress with the times and their understanding of the requirements for the electronic development direction of university libraries, closely follow the pace of the transformation and upgrading of library services, strengthen their own management ability, improve their competitiveness in the library industry, and give full play to their own values and advantages.

4.3. Strengthen the service form of electronic libraries

The electronic library is a library service space built based on the world's advanced and emerging technologies, including big data and intelligent technology. The main characteristics of the electronic library service is that it realizes intelligent service to a great extent, liberates people's hands, and reduces the investment in human resources. At the same time, on the basis of meeting the reading needs of different types of users, it also provides users with more targeted service methods and search methods based on their preferences. The service types of electronic libraries are not only guided by manual services, but also provide users with means of human-computer interaction and intelligent voice interaction, allowing people to select their own reading methods based on voice prompts [18,19].

4.4. Strengthen the interaction of electronic information resources

The design of interactive function is one of the most needed functions in electronic libraries. The use of interactive function can enhance users' interest in reading. The library is one of the important places for knowledge transmission, dissemination, and preservation of information interaction. In order to promote the interactive function, users must express their satisfaction toward the library services and whether the custody of electronic information resources is secure on the interactive platform. The interactive function helps improve interpersonal communication and knowledge distribution. Through password strengthening using interactive kinetic energy, it may also promote the development of electronic library resources, so as to further strengthen the utilization of electronic information resources in university libraries [20].

5. Conclusion

In conclusion, there are still some shortcomings in the utilization of electronic information resources in university libraries, such as the lack of publicity, strong network dependence, slow update speed, and weak

search function. In order to improve the utilization rate of electronic information resources, university libraries need to explore and innovate their electronic information promotion channels from the perspective of construction, publicity, and management, improve the interactive function and service form of electronic libraries, strengthen the training of electronic library managers, enhance the information level of personnel, as well as give better play to the role and value of electronic information resources in university libraries.

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Prediction of Online Consumers' Repeat Purchase Behavior via BERT-MLP Model

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Abstract: It is an effective means for merchants to carry out precision marketing and improve ROI by using historical user behavior data obtained from promotional activities in order to build a model to predict the repeat purchase behavior of users after promotional activities. Most of the existing prediction models are supervised learning, which does not work well with a small amount of labeled data. This paper proposes a BERT-MLP prediction model that uses "large-scale data unsupervised pre-training + small amount of labeled data fine-tuning." The experimental results on Alibaba real dataset show that the accuracy of the BERT-MLP model is better than the baseline model.

Keywords: Data mining; Business intelligence; E-commerce; BERT; Multilayer perceptron

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1. Introduction

The competition between e-commerce platforms is growing increasingly heated these days. In order to attract more consumers, e-commerce platforms have been inviting well-known figures and online celebrities to play a part in live sales promotions on special days, such as "Double 11" and "618." However, the majority of customers lured by these live sales promotions will only end up purchasing promotional products and will not become devoted anchor users or offer merchants long-term revenue. Therefore, to reduce promotion expenses and increase return on investment, it is necessary to forecast the users who will participate in promotional activities and identify among them those loyal customers who will make repeated purchases. The process of purchasing products on e-commerce platforms is accompanied by a variety of actions, including clicking, collecting, and adding to shopping carts. Large-scale user log data are left on the e-commerce platform after a promotion ends, and deep mining of this data can reveal users' preferences for a particular product and whether they are inclined to purchase it. This is an effective way to predict repeat purchase behavior.

In recent years, many scholars have conducted research and investigations on user purchase or repeat purchase behavior, and the existing research results mainly include individual models and ensemble models. The individual prediction model is a prediction model of users' repeat purchase behavior based on a single

machine learning algorithm. Multiple models such as logistic regression (LR) [1], support vector machine (SVM) [2], recurrent neural network (RNN), and multi-layer perceptron (MLP) [3] have been widely used in the prediction of users' repeat purchase behavior. With the continuous development of social commerce and the gradual expansion of user scale, the scale of users' historical behavior data has surged. Traditional machine learning algorithms cannot achieve ideal results by relying on the characteristics of numerous influential factors, thus necessitating a new machine learning algorithm that is tailored to large-scale data machine learning algorithms in order to improve prediction performance. Therefore, many researchers have proposed multiple integrated prediction models in combination with different individual prediction models, among which the most representative ones are Random Forest (RF), Gradient Boosting Decision Tree (GBDT), and XGBoost. Results have shown that the ensemble prediction model is superior to the individual prediction model in both accuracy and robustness [4]. Aiming at the prediction of online consumers' purchase behavior, Hu and Shi proposed a Long Short-Term Memory (LSTM)-RF prediction model based on the combination of LSTM and RF by analyzing the shopping data of consumers on an e-commerce platform, in order to improve the learning ability and prediction effect of the prediction model [5].

However, the aforementioned existing models have a common problem: they are all supervised learning, and the model effect depends on the quantity and quality of manually labeled labels. Hence, if the scale of the labeled data is small, the model cannot achieve the ideal prediction effect. Based on the massive public competition data left by the social commerce platform Alibaba during the "Double Eleven" sales, this paper analyzes the influencing factors of users' repeat purchase behavior, builds a BERT-MLP model for a small amount of labeled data, and predicts the after-promotion repeat purchase behavior of users who purchased goods during the promotion.

2. BERT-MLP prediction model of users' repeat purchase behavior

Using the idea of "unsupervised pre-training + fine-tuning of annotated data" in natural language processing, the BERT-MLP individual prediction model can maintain good prediction results even with a small amount of labeled data. Firstly, it performs unsupervised training on unlabeled user behavior sequence data to obtain the pre-trained BERT model [3]. Then, the pre-trained BERT model is fine-tuned with a small amount of labeled data [6]. Finally, the fine-tuned user behavior sequence output and user age and gender are cascaded through the MLP model and input to the classification layer [7] to perform the final classification output for users' repeat purchase behavior, as shown in **Figure 1**.

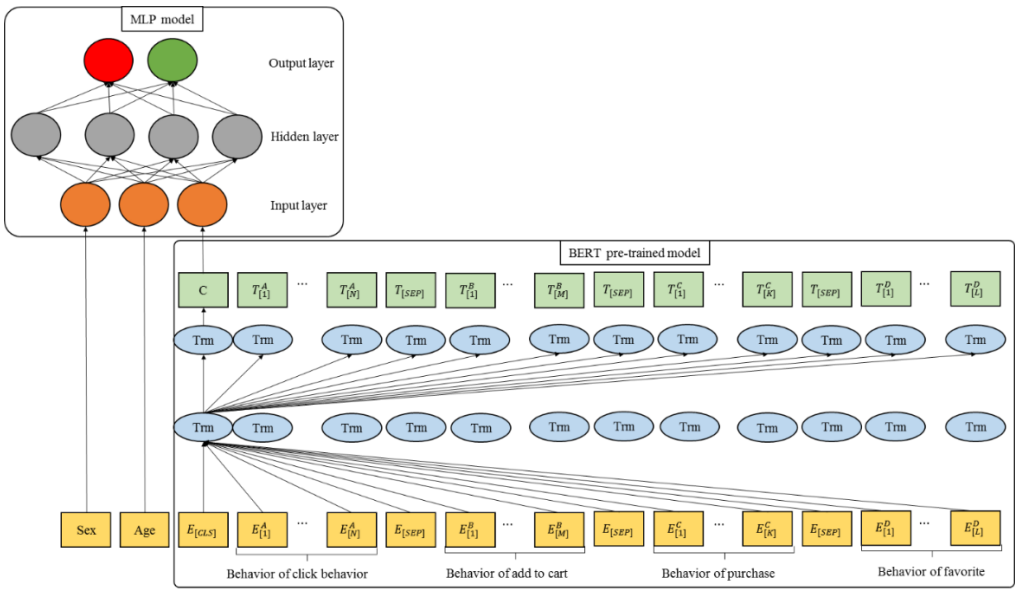

Figure 1. BERT-MLP individual prediction model framework

2.1. Pre-trained BERT model

BERT is a general natural language processing pre-trained model proposed by Google for multiple natural language processing (NLP) downstream tasks, such as sentiment analysis, named entity recognition, reading comprehension, and intelligent dialogue [8]. The model can dynamically encode word vectors based on contextual information, solve the problem of multiple meanings in natural language coding, and encode the logical relationship of each sub-clause in long sentences. Since user behavior sequences are highly similar to sentence sequences in natural language processing, a pre-trained BERT model has been built for the prediction of users' repeat purchase behavior by borrowing the current effective pre-trained BERT model in NLP. The model mainly includes a sequence encoding layer and a sequence information extraction layer.

2.1.1. Sequence encoding layer

The main function of the sequence encoding layer is to encode users' behavior sequence, which is convenient for the input sequence information extraction layer. Sequence encoding is achieved by the masking method and swap order. The masking method involves randomly masking 15% of the specific moment of behavior data and allowing the model to make predictions based on the information of the sequence of behaviors before and after that moment. There are three ways to achieve this.

(1) Null value substitution
80% masked behavior sequence is replaced with null values.

(2) Original value replacement
The behavior sequence for the 10% mask is replaced with the original value.

(3) Remaining value substitution
The sequence of behaviors for the 10% mask is replaced with the remaining values.

Swap order embodies the commutation method. First, the sequence of user purchase behavior is divided into two sub-sequences, and then the order of the two sub-sequences is exchanged. The specific implementation method is as follows: first, the user behavior sequence is divided into two subsequences by a special token [SEP], and then a subsequence unchanged behavior sequence and a subsequence swapped behavior sequence are input to the sequence encoding layer according to the 1:1 ratio, which facilitates the subsequent sequence information extraction layer to learn the logical relationship of the behavior sequence. The final output of the sequence encoding layer is the sum of token encoding, segment encoding, and position encoding. The segmented coding can divide the user behavior sequence into two subsequences and four types of user behavior sequences. The outputs of the four behavior sequences (click, add to cart, purchase, and favorite) in the sequence encoding layer are as follows: $E_A = \{e_a^1, e_a^2, \cdots, e_a^N\}$, $E_B = \{e_b^1, e_b^2, \cdots, e_b^M\}$, $E_C = \{e_c^1, e_c^2, \cdots, e_c^K\}$, and $E_D = \{e_d^1, e_d^2, \cdots, e_d^L\}$.

2.1.2. Sequence information extraction layer

The sequence information extraction layer adopts the Funnel-Transformer encoder [9]. Compared with the original Transformer encoder in the BERT model, the Funnel-Transformer adds a pooling operation to each block, which has higher computational efficiency and lower space consumption; in addition, it is more suitable for information extraction of user behavior sequences with longer sequences. The Funnel-Transformer encoder includes a Transformer encoder and pooling operation. The Funnel-Transformer encoder consists of N identical Transformer basic blocks stacked with pooling operations. A Transformer basic block consists of two sub-blocks, multi-head attention, and a feed-forward neural network. Residual connections and layer normalization connections are used between the two sub-blocks, as shown in **Figure 2**.

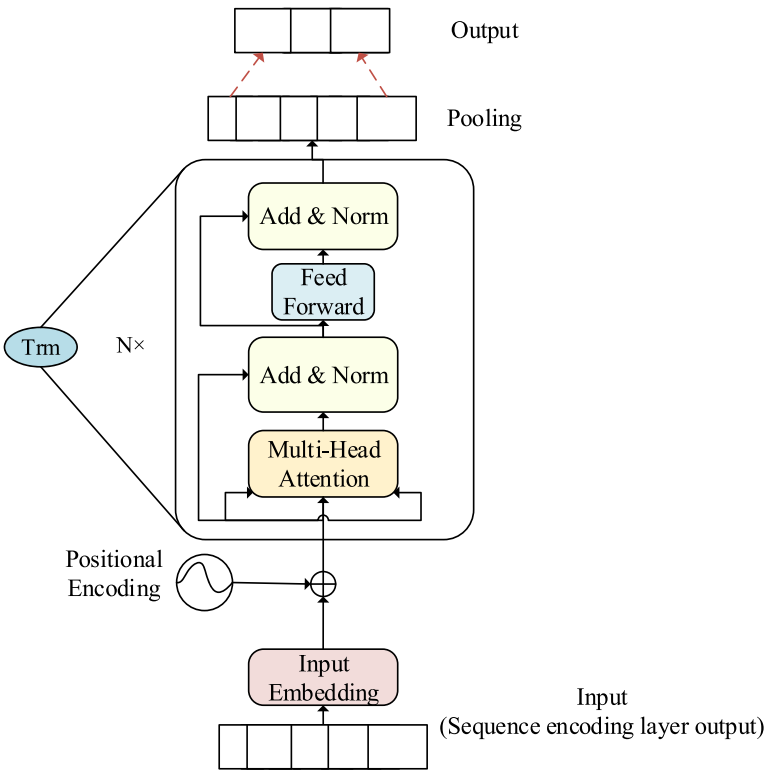

Figure 2. Funnel-Transformer encoder basic block

In order to deal with the low efficiency of Transformer in long behavior sequences, a pooling operation is added to the output vector of each Transformer basic block, except the output vector of the special token. The dimensions of Transformer output vectors in the direction of behavior sequences are compressed to reduce the number of model parameters and improve the efficiency of the model in long behavior sequences, as shown in Equation 1.

$$E^{'} \leftarrow Poooling(E^{*}) \tag{1}$$

E^{*} is the output vector of the Transformer basic block, $Poooling(\cdot)$ is the pooling operation, and $E^{'}$ is the output vector after pooling. At this point, the output of the Transformer basic block is shown in Equation 2.

$$E^{''} \leftarrow LN(E^{*} + S\text{elf-}A\text{ttion}(\mathrm{Q}^{'},\mathrm{K},\mathrm{V})) \tag{2}$$

E^{*} is the output vector of the Transformer basic block, $S\text{elf-}A\text{ttion}(\cdot)$ is the self-attention mechanism, and $\mathrm{Q}^{'}=E^{'}$ is the output vector after pooling. K and V are the same as the K and V of the base Transformer block before pooling.

2.2. Multilayer perceptron and model training

The multilayer perceptron (MLP) consists of three layers of nodes: an input layer, a hidden layer, and an output layer. The task of the input layer is to cascade the encoding information of user behavior sequence, user age, and user gender. The hidden layer includes multiple fully connected activation function neurons, and the hidden neurons are nonlinearly transformed through the Rectified Linear Unit (ReLU) activation function, as shown in Equation 3.

$$H = F(VW_h + b_h)W_0 + b_0 \tag{3}$$

$V = E''_{(n)} + E_{Age} + E_{gender}$ is the concatenated vector of the final user behavior sequence output vector, user age vector, and user gender vector of n Transformer-Pooling blocks; $F(\cdot)$ is the ReLU activation function, W_0 is the weight vector, and b_0 is the bias term. The main task of the output layer is to classify whether the output users have repeat purchase behaviors, as shown in Equation 4.

$$y = \text{softmax}(x) = \frac{\exp(x)}{\sum_{k=1}^{c} \exp(x)} \tag{4}$$

$y \in R^c$ represents users' repeat purchase behavior category; c=2 represents the two behavior categories of users {repeat purchase, non-repeat purchase}. The model adopts the cross-entropy loss function, and the parameters are trained and optimized through the backpropagation algorithm.

3. Experiments and analysis

3.1. Dataset

The data in this paper are derived from the complete behavior data of more than 400,000 users and millions of commodity information provided by Alibaba's "Tianchi Big Data Competition" [10]. The data consist of two parts: user behavior data and user information data. The aim of this study is to predict whether users will repeatedly purchase products from the same merchant within half a year after the end of the promotion based on the historical behavior data of users on the "Double Eleven" sales and the first half-year of the social commerce platform. The test dataset is similar to the training dataset, except that the label field is Null.

3.2. Experimental environment and hyperparameters

The detailed configuration of the experimental environment in this paper is shown in **Table 1**.

Table 1. Experimental environment configuration list

Type	Name	Configuration
Hardware	Central processing unit	Intel(R) Xeon(R) CPU E3-1226 v3 @ 3.30GHz
	Memory	32GB
	Graphics processing unit	NVIDIA GTX1080Ti 11GB
Software	Operating system	Windows 10 Enterprise LTSC x64 1809
	Programming language	Python 3.7
	Machine learning framework	Sklearn 0.23.1
	Natural Language Processing Framework	Gensim 4.0.1
	Deep Learning Framework	PyTorch LTS 1.8.1

The recommended hyperparameter values of existing research results are referred to, in order to reduce the number of parameter combinations and improve the efficiency of parameter selection. The final results of the main hyperparameter selection of the BERT-MLP model are shown in **Table 2**.

Table 2. BERT-MLP main parameter configuration list

Parameter name	Parameter value
layer	12
hidden	768
heads	12
parameters	110M
loss_functioSn	Adam
Max_seq_length	128
masked_lm_prob	0.15
random_seed	12345
dupe_factor	5
learning rate	1e-4
hidden_layer_sizes	256

3.3. Evaluation index

The prediction of users' repeat purchase behavior is a two-class problem in machine learning; hence, the three most commonly used evaluation indicators for two-class machine learning models have been chosen: accuracy, F1 score, and AUC.

3.4. Experimental results and analysis

In order to verify the effectiveness and practicability of the BERT-MLP model, it is compared with five baseline models (LR, KNN, RF, GBDT, and XGBoost) and two ablation models (MLP and BERT) under the same dataset and experimental environment. In order to ensure the accuracy and objectivity of the experimental results, ten-fold cross-validation is used to train each model, and the average value of accuracy, F1 score, and AUC are obtained as the final statistical results of the model, as shown in **Table 3**.

Table 3. Experimental results of the FCV-Stacking ensemble model, four individual models, and five baseline models

Category	Model	Accuracy	F1 score	AUC
Baseline model	LR	0.8685	0.7825	0.5720
	KNN	0.9225	0.7863	0.5981
	RF	0.9355	0.7833	0.6145
	GBDT	0.8685	0.7991	0.5830
	XGboost	0.9305	0.7833	0.6179
Ablation model	MLP	0.9362	0. 7952	0.6279
	BERT	0.9350	0.7983	0.6220
	BERT-MLP	0.9355	0.7991	0.6232

Table 3 shows that the accuracy, F1 score, and AUC of the FCV-stacking model are better than the comparison model. This indicates that the FCV-Stacking integrated prediction model is more effective in the selection and fusion strategy of individual models. The main reasons are as follows: based on the tree model, the DeepGBM individual model in the FCV-Stacking ensemble model not only effectively processes the dense numerical features in users' historical behavior data, but also the large-scale sparse classification features, thus further enriching the feature types and improving the performance of the model

compared with the RF, GBDT, and XGboost ensemble learning models,; DeepCatBoost leverages the advantages of layer-by-layer feature learning in deep learning and has better feature learning capabilities than RF, GBDT, and XGboost ensemble learning models. At the same time, this paper not only considers DeepGBM and DeepCatBoost individual models based on the tree model but also constructs DABiGRU based on neural network and the BERT-MLP model based on attention mechanism when building the ensemble model. This greatly increases the differences between the individual models in the FCV-Stacking integrated model, fully exploits the excellent feature learning ability of the tree model and the better data learning ability of the neural network, as well as synergizes with their respective advantages to improve the model effect and generalization ability. In addition, the experimental results show that the two linear models, LR and KNN, have poor performance and are not suitable for the repeat purchase behavior prediction task with large data scales and complex structures. By adding the MLP layer to the BERT-MLP individual model, the model effectively combines the two key influencing factors of user gender and user age with the original BERT representation of behavioral sequence information, thus improving the overall effectiveness of the model.

4. Conclusion

This paper takes the prediction of social business users' repeat purchase behavior as the research goal, conducts research on Alibaba real dataset, and proposes a BERT-MLP prediction model, which has been evaluated in three metrics: accuracy, F1 value, and AUC. It achieved better experimental results than the selected baseline models on all metrics. In order to further improve the F1 value and AUC, knowledge base will be integrated into the BERT-MLP model in the future. The research results are of great significance for improving users' purchase experience and for merchants to enhance their live broadcast strategy in a targeted manner, which is conducive to maintaining the healthy and orderly development of e-commerce platforms.

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Disclosure statement

The authors declare no conflict of interest.

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Application Strategy of Panoramic Technology in Environmental Field Investigation

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Abstract: In order to improve the efficiency and quality of environmental field investigation, as well as realize real-time image data information sharing between the field environment and the investigation center, this paper first analyzes the application advantages of panoramic technology, followed by the types of panoramic technology, and finally takes the UAV panoramic technology as an example to demonstrate the application process of panoramic technology in environmental field investigation for the reference of relevant personnel.

Keywords: UAV panoramic technology; Environmental investigation; Sphere panorama

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1. Introduction

The world we live in contains all kinds of information, such as color, shape, sound, and taste. Human beings are constantly evolving, perceiving and obtaining information through seeing, touching, hearing, and smelling. Among all the ways of perceiving the external world, the visual system accounts for 70% of the total amount of information, and it has become the most important way to obtain external information [1]. In today's digital age, images and videos have become the most intuitive and effective way for human beings to obtain information from the outside world. According to Cisco, by the end of this year, nearly one million minutes of video content per second will flow through the network, increasing the proportion of global IP video traffic to 82% of all private internet traffic [2]. However, with the increasing needs of users, the limitations of traditional image and video data are becoming more apparent. The limitations of the existing image and video data are mainly reflected in two aspects. First, traditional image and video data cannot provide users with a panoramic view [3], and their acquisitions are limited by the site environment, which hinders the integrity of the comprehensive description of the site environment. Second, the traditional image and video acquisition methods cannot provide users with a free-viewing experience. When viewing images and video information, users do not have sufficient interaction with the on-site environment.

2. Benefits of applying panoramic technology

2.1. A real 3D viewing experience

With binocular parallax [4], when observing the real world, the human eye can accurately gauge the actual distance and position relationship between objects in the scene, thus producing a three-dimensional viewing experience. Depending on the viewpoint selected by the user in panoramic application, combined with the head-mounted display (HMD) device, the image or video data of two channels with specific parallax are

sent to the left and right eyes of the user, respectively, which will then stimulate binocular parallax. It can reconstruct the real scene and the user's brain, as well as provide users with 3D immersive viewing experience.

2.2. Whole-scene viewing by selecting a single viewpoint

In panoramic application, the sender collects the entire scene information, and the receiver reconstructs the real scene and presents the entire scene to the user. Following that, users can freely choose the viewing position and angle in the scene. While watching, they can freely switch according to their preferences and explore details everywhere. Therefore, panoramic application breaks the restriction that users can passively view content from a specific place in traditional 2D applications, thus allowing users to freely view the scene from any position and angle they wish [5].

2.3. Scenario interaction

In addition to viewing scene information from any location, panoramic application also allows users to interact with the scene using gestures, voice, and other interactive methods. In the interaction process, users can perform various actions, such as switching viewpoint, controlling playback progress, and zooming in the scene. At the same time, panoramic application provides timely feedback based on the user's operation. In that way, panoramic application provides users with means to interact with objects in the scene, so that users can freely control objects in the scene and interact with virtual scenes. It enhances users' immersive viewing experience.

Compared with existing 2D applications, panoramic applications have attracted wide attention from academia and industry with the aforementioned advantages. Accordingly, panoramic monitoring, three-dimensional scene reconstruction, panoramic viewing, and other panoramic applications are also being introduced in succession. Therefore, panoramic application has gradually become the mainstream form of visual information display. However, in practical applications, panoramic applications not only provide users with immersive viewing experience, but also bring new challenges and difficulties to the existing compressed transmission system. First, compared with the fixed-point sampling mode of 2D applications, full sampling of the scene requires simultaneous sampling of various positions and angles of the scene at a specific time point to obtain image and video data that can perfectly represent the scene, which provides users with the freedom to view stereoscopic images and videos from any perspective. Second, compared with 2D applications, the data transmission speed and channel of panoramic technology provide users with a better observation experience. Panoramic technology has efficient coding technology, a large amount of storage space, and a fast transmission environment, which provides users with a good environment for viewing. Third, compared with the viewing method of 2D applications, panoramic technology can realize on-site interaction with users, has higher freedom, and can provide users with high-quality and immersive viewing experience [6-10].

3. Types of panoramic technology

3.1. Cylindrical panorama

Cylindrical panorama is the simplest virtual panorama, which has a 360-degree horizontal (or larger angle) view. For simulation-generating workstations, computer screens are used as windows for users to observe the virtual environment. By dragging the mouse left and right in the horizontal direction, the user can observe the left and right landscapes. However, if the user drags the mouse up and down, the visibility is limited. If it is empty, the viewer will not be able to see below or above. Cylindrical panorama can be taken with an ordinary camera. At present, many smartphones are equipped with panorama mode. When turning the phone's camera, a small slider appears on the screen, and the slider can be moved to make changes.

Users should ensure that the phone is kept horizontal and stable, while minimizing vertical offset. Otherwise, the panoramic picture will display a connection error. The small slider will end the progress; users may click the shutter button to end the shooting at any time, and the camera will then automatically produce the panoramic picture. At present, the built-in panoramic mode of most mobile phones in the market allows users to take panoramic photos of more than 180 degrees. Many mobile phones can also take photos of 240 degrees or 270 degrees. With the installation of certain software, it can also support 360-degree shooting, that is, "draw a circle." However, the panoramic shooting of mobile phones has a certain test on the stability of handheld shooting [11].

Therefore, environmental investigators often use ordinary photos for synthesis and splicing to obtain high-quality panoramic photos, in which a series of conventionally sized photos are taken clockwise or counterclockwise. Users should pay attention to the boundary overlap of adjacent photos, and then use image processing software to adjust the brightness, contrast, hue, sharpness, and other elements. After taking photos, users can import the photos into the static panorama creation software. They can insert, delete, move, rotate, and rearrange the photos as needed. Finally, these photos as panorama photos or web pages can be saved for use.

3.2. Spherical panorama

Spherical panorama, which has 360 degrees horizontal and 180 degrees vertical viewing, allows for a more realistic virtual scene experience. When used in a closed scene, the sound system is completely invisible; hence, users need to monitor it with their eyes. Using the world's hearing in a computer-generated environment gives users a fully-engaged, immersive feeling.

The production of spherical panorama is more professional. First, two photos need to be taken with a professional fisheye lens, and then a spherical panorama is produced by using a professional software. At present, China has made remarkable achievements in this field of expertise. For instance, China Haida's iSCAN series, with multiple fisheye HD cameras equipped in on-site acquisition equipment, can realize material shooting and data processing. The panoramic mosaic software HD Pano factory provides full functions, such as data detection, panoramic output, output detection, panoramic PS processing, and algorithm-based thumbnail generation. In addition, this set of equipment and software utilizes the GPS positioning system to collect point clouds and models, slice pictures, and create street scenes; the continuous shooting function of the HD camera can produce continuous panoramic pictures to complete roaming. HD MapCloud RealVision software is reliable. In addition to more professional spherical shooting, ordinary mobile phones can also complete shooting through software. For example, Google camera has a photo sphere mode. There is a "ball" and a "big blue dot" in the middle of mobile phones to guide users to gradually capture the spherical panorama. These are the photos required for photo splicing. For this 360-degree panoramic shooting software, Google suggests that when taking spherical panoramic photos, the mobile phone should be close to the face to improve the synthesis rate, while avoiding close shooting and maintaining posture. It is necessary to keep away from crowds during shooting to avoid ghosting. However, in the actual work process, the software naturally splices multiple pictures, so it is very important to ensure the angle of the mobile phone during the shooting process [12-14].

3.3. Cube panorama

Cube panoramic technology is another splicing technology to realize panoramic view. It defies the existing splicing technology of single spherical panorama, in which it splices panoramas with higher accuracy and storage efficiency. Cube panorama is mainly used to build an indoor virtual environment. For example, the simulation of model houses by real estate developers. Customers can fully view the three-dimensional structure and design of various model houses by sitting in front of the computer and dragging the mouse.

If users wish to have a more immersive experience, they can use the CAVE virtual reality system and the rectangular projection image collaborative environment based on multi-channel image synchronization technology and stereo display technology, so as to fully immerse themselves in the closed advanced virtual simulation environment. With the interactive experience from the corresponding virtual reality interactive equipment, users can obtain immersive high-resolution 3D stereo audio-visual images and six degrees of freedom.

The production of cube panoramic photos is a complicated process. First of all, all pictures should be taken when taking photos, but for ordinary digital cameras, a lot of photos need to be taken (finally combined into 6 photos).

They are then spliced together using a special software, such as Pano7cd, to create a panoramic image expanded into a cube. Ordinary mobile phones can also complete cube shooting through Google camera and other software. In the "panorama" mode, there is a cube shooting mode, and the "big blue dot" is used to guide users through the process of capturing the frames needed for photo splicing. The perspective of the photos shot in this mode is strong, but the direction of the photos must be high; otherwise, the close-up photos will be prone to perspective distortion.

3.4. Object panorama

The panoramic view of the subject is different from the panoramic view of the scenery. The camera must be facing the subject directly when shooting, and one of the two shooting methods – equatorial mountain or environment – is used. In other words, the tripod rotates around the central axis of the subject, takes a picture around the subject, and then uses the object panoramic mosaic and playback software to create and explore the object panoramic picture. Object panoramic technology is mainly used in commercial fields, such as the automobile industry. It produces 3D panoramic automobile models through web pages, allowing users to visually view and purchase automobiles. However, in recent years, object panoramic technology has also been used to safeguard cultural heritage digitally, such as in the 3D reconstruction or reproduction of cultural assets in conjunction with 3D modeling technology, allowing cultural assets to be separated from regional restrictions and resources. The sharing of these cultural assets can be realized through the internet [15].

The 3D laser scanning technology is used to create a rough point cloud model of the object, and the image data acquisition technology is used to create the details displayed through the texture material, resulting in a more realistic panorama of the object. An image processing software (such as Photoshop) can then be used to perform necessary operations on the photos, such as cutting, splicing, deformation, and sharpening; finally, a 3D modeling software (such as 3ds Max) can be used to complete, map, and illuminate.

4. Application process of UAV panoramic technology

UAV panoramic technology is a type of panoramic technology. UAV panoramic technology is taken as an example to highlight the application of panoramic technology. In order to enable technicians to employ UAV panoramic technology to complete the image modelling task, all departments involved in field environmental investigation should focus on improving themselves and fulfilling their individual tasks.

4.1. Panoramic image acquisition

When applying the UAV panoramic technology, technicians should pay attention to image acquisition. By reasonably setting the UAV, the accuracy of the collected image data can be assured. Generally, technicians attach great importance to the collection and sorting of existing data, as well as strive to obtain high-resolution image data to meet the information collection tasks for various purposes. For image acquisition, it is necessary to select appropriate UAV types according to different scenes. Common UAVs are divided

into fixed wing, large rotor, and small rotor. Technicians must reasonably select technical equipment for use to complete various tasks according to the investigation needs of the actual environment. During the operation, technicians must combine the data transmitted by the UAV to realize effective monitoring of the project.

4.2. Panoramic image creation

Panoramic images can reflect real-time scenarios of the site environment and facilitate easier viewing for the investigators and other relevant personnel. The UAV panoramic technology allows operators to fully exploit the benefits of the obtained image data, complete the production of panoramic images, improve the definition of the overall projection, and ensure the smooth transition between existing images. Technicians collect and process data to create panoramic images as well as capture and monitor the images of the surrounding environment through the UAV camera technology, so as to create a set of panoramic images of the site environment in the control center. In the application of this technology, some images often overlap. In order to further improve the overall work quality, technicians need to strengthen the representation and recognition of the same image and complete the creation of panoramic images. Only by precision work can we ensure that the panoramic images are clean and complete, and that they meet the requirements of environmental field operations.

4.3. Panoramic image navigation

Panoramic image navigation enables users to better understand and view the site environment. The development of panoramic image navigation relies heavily on panoramic images. For panoramic picture navigation, technicians must select appropriate panoramic images, apply the UAV panoramic technology more effectively, and improve the quality of environmental field investigation. Users can select spherical panoramic images and configure the panoramic image navigation based on the site conditions and their own demands. They can click to view all the images according to some of the displayed image information. In practical application, technical personnel must formulate scientific and reasonable countermeasures based on the site conditions to meet the needs of users. Since panoramic images contain a large amount of data, technical personnel must formulate appropriate response mechanisms to realize the whole process environmental investigation control and adapt to the needs of the current on-site environmental investigation business, in order to maximize the overall environmental investigation quality.

5. Conclusion

In conclusion, panoramic technology enables users to engage in a real 3D viewing experience, select a scene to view it in entirety, and conduct on-site interactions. In the application of panoramic technology in environmental field investigation, panoramic images must first be collected and then created, and finally, image navigation is perfomed to form a complete on-site environment image.

Disclosure statement

The authors declare no conflict of interest.

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Analyzing the Construction of the International Logistics Supply Chain Management Model from the Perspective of Cross-Border E-commerce

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Abstract: Cross-border e-commerce has progressively evolved with the deepening of economic globalization, and it now holds a significant place in the field of e-commerce. However, due to China's late entry into the international logistics supply chain, there are issues such as complex environment, uneven information technology, and disagreements on standards, resulting in certain cross-border e-commerce disadvantages in China. Therefore, in this context, this study analyzes the construction of international logistics supply chain management model from the perspective of cross-border e-commerce, so as to provide some reference for the development of China's international logistics supply chain.

Keywords: Cross-border e-commerce; International logistics; Supply chain management

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1. Introduction

Logistics supply chain, as a critical component of e-commerce, serves as the foundation and premise for the growth of the industry. The development of the logistics industry hinges on optimizing the logistics supply chain management model for the new form of cross-border e-commerce that has emerged as a result of economic globalization.

2. An analysis of cross-border e-commerce

2.1. A conceptual analysis of cross-border e-commerce

Cross border e-commerce refers to an international business activity, in which transaction subjects belonging to different customs territories complete transactions through e-commerce platform, conduct e-payment and settlement, as well as deliver goods through cross-border e-commerce logistics and remote warehousing [1].

2.2. An industry model analysis of cross-border e-commerce

2.2.1. Global

Cross border e-commerce is primarily based on the network, which is a media with features of globalization and decentralization without boundaries [2].

2.2.2. Intangibility

Digital products and services are mainly used for transmission in e-commerce through network-based

transactions. Digital transmission is concentrated in the global network environment through various types of media, including data, sound, and images, making cross-border e-commerce invisible [3].

2.2.3. Anonymity

Due to the decentralized and globalized characteristics of cross-border e-commerce, it is difficult to identify the identity and geographical location of e-commerce users. Trading consumers often do not reveal their true identity and geographical location, so anonymity is also an important feature.

2.3. The impact of cross-border e-commerce on logistics supply chain

In the context of economic globalization, although e-commerce is developing rapidly, it is still in its infancy. Due to the influence of transportation environment, time difference, and other factors, there is a certain delay in the transmission of logistics information. Moreover, cross-border e-commerce is mostly used across nations, but its information technology is uneven between different countries. This brings difficulties to logistics supply chain management [3]. Finally, logistics distribution channels are restricted owing to geographical constraints, which has a significant impact on the growth of the industry.

3. Analyzing the construction of the international logistics supply chain management model from the perspective of cross-border e-commerce

3.1. Optimizing the organizational structure and business process of logistics enterprises

When analyzing the construction of international logistics supply chain management from the perspective of cross-border e-commerce, the organizational structure and business process of logistics enterprises are the key factors. Only on the basis of scientific and reasonable internal structure and process can we ensure the improvement of international logistics. Therefore, in actual analysis, a good internal environment can be created by optimizing the organizational structure and business process as well as strengthening the cooperation between various departments within an enterprise, so as to provide the foundation and premise for international logistics supply chain management [4].

For example, in the process of optimizing the organizational structure, enterprise leaders should first change their own ideas, in order to achieve a breakthrough in the limitations of traditional thinking. In view of the developing cross-border e-commerce environment, they should strengthen their own inclusiveness and service by changing their own business ideas and taking the market as the guide, so as to provide some reference for international logistics supply chain management. Additionally, logistics enterprises can also improve external working departments and establish professional departments, such as international marketing department, international publicity department, international public relations department, and international service department, for international logistics business, so as to lay the foundation for the international logistics supply chain management model and thus effectively improve the quality and level of the supply chain [4]. In the optimization and improvement of business processes, it is crucial to understand one's own strengths, especially in a complex environment, such as cross-border e-commerce. Enterprises should define their main businesses and determine their core competitiveness through an understanding of their own strengths, so as to provide a certain basis for supply chain management under the international background. For example, an enterprise can focus on safety and speed as its strengths, in order to advance its brand in the chaotic international situation, and then effectively improve the level and quality of international logistics supply chain management on the basis of facilitating supply chain management [5].

3.2. Constructing an effective talent team

Effective talent advantages are incredibly important in such a complex environment if logistics enterprises wish to gain certain benefits, which is of significant importance to facilitate international supply chain

management and enhance the level of international supply chain management. Therefore, when analyzing the construction of international logistics supply chain management from the perspective of cross-border e-commerce, enterprises can make use of talent advantages to realize the optimization and development of their supply chain by improving the construction of their own talent team [6].

For example, in actual analysis, enterprises can improve and optimize their own talent team from two levels, so as to provide the backbone for the construction of the international logistics supply chain management model through talent advantages. Firstly, aiming at the improvement of the talent team, logistics enterprises should recruit talents with certain experience in international logistics supply chain management through targeted recruitment, so as to effectively improve their own supply chain management team and the construction level of the international logistics supply chain management model [7]. Moreover, logistics enterprises can also identify the management construction subject through talent drainage and senior talent recruitment, so as to improve the efficiency and level of the construction of the international logistics supply chain management model. Secondly, aiming at improving the quality of the supply chain management team, realizing new recruitment, and improving the management team is often not realistic for enterprises. This requires not only a hefty sum of investment, but also a lot of time [8]. Therefore, by improving their own logistics supply chain management team and cultivating the international logistics situation, knowledge, and skills, logistics enterprises can improve the level and speed of the construction of international logistics supply chain management.

3.3. Strengthening the application and improvement of electronic information technology

Both, cross-border e-commerce and international logistics rely heavily on electronic information technology [9]. However, due to China's late entry into the international logistics industry, most enterprises still use the traditional management model and methods, neglecting electronic information technology. Therefore, the efficiency and timeliness of management tend to be below par. When analyzing the construction of international logistics supply chain management from the perspective of cross-border e-commerce, it is possible to improve the efficiency and level of international logistics supply chain management by strengthening the application and improvement of electronic information technology as well as taking electronic information technology as the core technology in the management [10].

For example, in actual analysis, we can effectively improve the efficiency and level of international logistics supply chain management by strengthening the application and improvement of electronic information technology as well as utilizing the rapid interaction of information [11]. In the actual construction process, logistics enterprises can establish an internal information interaction system based on internet technology, so as to improve the timeliness and effectiveness of information interaction as well as the level of international logistics supply chain management. With the current development of 5G network in China, learn from the app mode of nailing and enterprise wechat, build an information interaction system within its own enterprise, and strengthen the information interaction between domestic and foreign sites in the international logistics supply chain, so as to effectively improve the quality and level of international logistics supply chain management [12].

3.4. Strengthening cooperation between cross-border enterprises

When analyzing the construction of international logistics supply chain management from the perspective of cross-border e-commerce, in addition to the optimization and improvement of domestic aspects, logistics enterprises can also strengthen cooperation with cross-border enterprises through the improvement of the supply chain management concept, the benefit distribution mode, and the application of product clustering, so as to effectively improve the efficiency and level of the construction of international logistics supply chain management model, as well as promote the optimization and development of China's national

logistics industry.

For example, in actual analysis, the first is to improve the logistics supply chain management concept of cross-border enterprises and effectively strengthen their competitive advantages as well as the response and adaptation to the international environment through mutual cooperation, so as to establish a management model with the overall situation in mind and thus enhance the competitive advantages of logistics enterprises in the international market. The second is to effectively learn from benefit distribution, make full use of the advantages of cross-border enterprises through the construction of information sharing platforms, and achieve a win-win situation, so as to provide a certain guarantee for international logistics supply chain management. Finally, by taking advantage of product clustering, the concentration of resources can enhance the development of enterprises, boost the strength of enterprises, and improve the construction level of the international logistics supply chain management model [13].

4. Conclusion

In the process of exploring the construction of international logistics supply chain management from the perspective of cross-border e-commerce, it is not only necessary to fully understand about cross-border e-commerce, but also the current situation of international logistics supply chain management, and then optimize the construction by using domestic and foreign ideas, so as to build a set of efficient and ideal international logistics supply chain management model, thus effectively improving the efficiency and level of management.

Disclosure statement

The author declares no conflict of interest.

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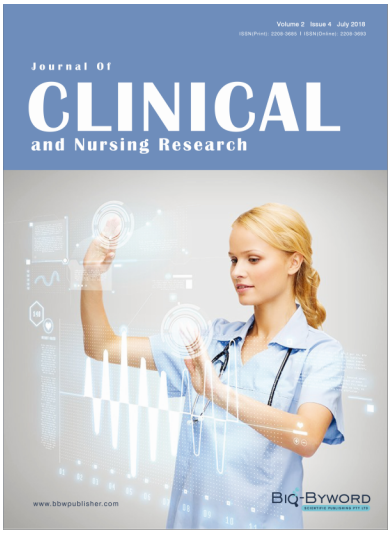

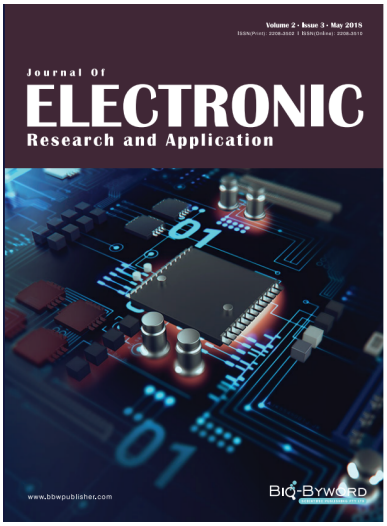

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