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International Journal of Web Based Communities

ISSN online: 1741-8216 - ISSN print: 1477-8394
https://www.inderscience.com/ijwbc

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DOI: 10.1504/IJWBC.2024.10061788

Article History:

Received:	01 June 2023
Last revised:	27 July 2023
Accepted:	10 October 2023
Published online:	04 November 2024

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Accurate prediction of purchasing behaviour of cross border e-commerce consumers under social media marketing

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Abstract: Traditional cross-border e-commerce consumer purchase behaviour prediction methods have problems with low reliability and high prediction error rate. This article designs a research on accurate prediction of purchasing behaviour of cross border e-commerce consumers under social media marketing. Firstly, determine and extract the purchasing behaviour characteristics of cross-border e-commerce consumers under social media marketing. Then, determine the initial centroid set of feature data, determine similar data by calculating the Euclidean distance between feature data, and remove similar data. Finally, by calculating the information entropy of the feature data, determine the weight value of the feature data, and use the integration algorithm and loss function to achieve accurate prediction of purchase behaviour. The test results show that the proposed method improves the reliability of prediction and reduces the prediction error rate.

Keywords: social media marketing; cross border e-commerce consumers; purchase behaviour; logistic regression; Euclidean distance; histogram algorithm.

Reference to this paper should be made as follows: Guo, Z. (2024) 'Accurate prediction of purchasing behaviour of cross border e-commerce consumers under social media marketing', *Int. J. Web Based Communities*, Vol. 20, Nos. 3/4, pp.340–354.

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1 Introduction

With the rapid development of electronic information technology, social media has become an indispensable component of people's lives. The emergence of a large number of social media platforms has changed people's communication methods, and people are gradually implementing their interactions on multiple social media platforms (Kour et al., 2021), while also promoting the rapid development of e-commerce. People use social

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media platforms to select and purchase products, while cross-border e-commerce consumers directly purchase foreign products through social media platforms (Yu and Huang, 2022). Social media has built a new bridge between consumers and products, becoming a key way of marketing (Xu et al., 2021). At present, cross-border e-commerce consumers are increasingly accessing product services through social media, and the required product brands and types are also very diverse. This encourages cross-border e-commerce consumers to effectively utilise social media platforms to obtain more satisfactory purchasing services (Panchasara and Dangarwala, 2022). It can be said that the purchasing behaviour of cross-border e-commerce consumers directly affects the economic development and future development strategies of cross-border e-commerce enterprises. Therefore, accurate prediction of cross-border e-commerce consumer purchasing behaviour is crucial. Therefore, relevant researchers have proposed and designed effective prediction methods.

Li et al. (2022) proposed and designed a consumer purchase behaviour prediction method based on oversampling method and improved radial basis function classifier. This method proposes a new oversampling method Tomek CASUWO and a new classifier ILS-RBFNN to improve the accuracy of customer consumption behaviour prediction. Analysed the current prediction methods that are susceptible to the influence of noisy samples and fuzzy class boundaries, proposed Tomek CASUWO to solve these problems. By using the Tomek links algorithm to filter noisy samples and using CASUWO to avoid overlapping class boundaries; A hybrid kernel was developed by combining Gaussian and polynomial functions; And use immune algorithms to optimise the RBFNN centre, and use the least squares method to calculate the predicted bias and weight to achieve consumer purchasing behaviour prediction. The accuracy of consumer purchase behaviour predicted by this method is high, but the prediction sample data studied is less, and more data validation is needed to verify the feasibility of this method. Li et al. (2021) designed a transaction based setting and graph based method for predicting the purchasing direction of cross-border e-commerce consumers. This method points out that with the goal of increasing business revenue, purchase prediction based on user behaviour is crucial for e-commerce. However, due to the lack of relevant datasets, the prediction of their purchasing behaviour is not effective. Specifically, there is no public dataset that provides both price and discount information over time, which plays a crucial role in user decision-making. In addition, existing learning ranking methods cannot clearly predict the purchase likelihood of specific user item pairs. Therefore, a two-step graph based model is proposed, where the graph model is applied in the first step to learn the representation of users and items on click data, and the second step is a classifier that combines the price information of each transaction record. To evaluate the performance of the model, a transaction based framework was proposed, focusing on the purchased items and their contextual clicks, which include items that users are interested in but cannot select after comparison. Verified that utilising price and discount information can significantly improve the prediction accuracy of cross-border e-commerce consumers' purchasing behaviour. Li and Jie (2021) analysed the impact of social interaction on the purchasing behaviour of social commerce consumers to predict their purchasing behaviour. The prediction method used survey data from 622 consumers to empirically test the hypotheses proposed in the study. Result: The research results indicate that user website interaction, user seller interaction, user user interaction, and user online friend interaction can significantly enhance users' physical presence; User seller interaction, user user interaction, and user netizen interaction can significantly enhance users' social

influence; In addition to the interaction between users and sellers, other variables can significantly enhance the user's traffic experience; Physical presence and social presence significantly affect users' impulse purchase intention, but have no significant impact on repeat purchase intention; The traffic experience significantly affects users' impulse purchase intention and repeat purchase intention.

On the basis of the above methods, this article designs a research on accurate prediction of purchasing behaviour of cross border e-commerce consumers under social media marketing. The committed step of this method are as follows:

1 Briefly clarify the characteristics of social media marketing, analyse in detail the development and operational characteristics of this model, extract the influencing factors of cross-border e-commerce consumer purchasing behaviour, determine the extraction of cross-border e-commerce consumer purchasing behaviour characteristics as habit characteristics, purchasing preference characteristics, and social media platform oriented characteristics, and introduce factor analysis method The width learning algorithm and the method of constructing feature histograms are used to extract the purchasing behaviour features of cross-border e-commerce consumers.

2 Randomly select sample data of purchasing behaviour features, determine the initial centroid set of feature data, calculate the Euclidean distance between feature data, determine similar data, and remove similar data to achieve preprocessing of cross-border e-commerce consumer purchasing behaviour features.

3 With the help of Logistic regression algorithm, the above cross-border e-commerce consumers' purchase behaviour characteristics are classified and studied, the weight of cross-border e-commerce consumers' purchase behaviour characteristics data is determined, the information gain of characteristic data is calculated, and the Ensemble learning algorithm is introduced to build an accurate prediction model of cross-border e-commerce consumers' purchase behaviour under social media marketing, so as to achieve accurate prediction of cross-border e-commerce consumers' purchase behaviour.

2 Extraction and preprocessing of purchasing behaviour characteristics of cross-border e-commerce consumers

2.1 Extraction of purchasing behaviour characteristics of cross-border e-commerce consumers

To achieve accurate prediction of cross-border e-commerce consumer purchasing behaviour under social media marketing, it is first necessary to extract the influencing factors of cross-border e-commerce consumer purchasing behaviour. Before extracting, it is necessary to briefly clarify the characteristics of social media marketing and understand the internal driving forces generated by cross-border e-commerce consumer purchasing behaviour under this marketing model. Therefore, starting from the characteristics of social media marketing, this article analyses in detail the development and operational characteristics of this model, laying the foundation for accurate prediction of cross-border e-commerce consumer purchasing behaviour in the future.

Currently, social media is widely recognised as essentially a software or tool, and these social media software or tools are all free to use. As a medium of communication and communication, social media designs and provides personalised service needs for different users, and builds a communication platform for each user's shared viewpoints, information, etc. (Lv and Liu, 2021). On this platform, social media users can freely express their opinions and browse information of interest. And this information is retained in the platform through text, video, and image forms. This data is mined and utilised by social media marketing platforms to form social media marketing. At present, the most common social media impact platforms in China are WeChat, Weibo, Tiktok, Kwai, etc. User information obtained on this platform is mainly released through users. With the help of this social media platform, enterprises can share facts and interact with users, breaking the imbalance between traditional enterprises and customers (Chaudhuri et al., 2021). The characteristics of social media marketing are mainly reflected in diverse forms, strong interactivity, humanised sales, and multiple marketing methods. Cross border e-commerce consumers can achieve their purchasing needs through various social media marketing platforms. To predict their purchasing and consumption behaviour based on different social media marketing platforms, it is necessary to fully understand the key features of social media marketing (Liu et al., 2021).

Based on the above analysis of social media marketing characteristics, in order to achieve accurate prediction of cross-border e-commerce consumer purchasing behaviour, further extract the characteristics of cross-border e-commerce consumer purchasing behaviour under social media marketing. In these feature extraction processes, it is mainly necessary to extract the characteristics of cross-border e-commerce consumers' purchasing behaviour habits, purchasing preferences, and social media platform oriented features as the starting point for feature extraction (Long and Ha, 2021).

In the extraction of purchasing behaviour characteristics of cross-border e-commerce consumers, the purchasing behaviour habit characteristics of cross-border e-commerce consumers refer to a purchasing habit that has a certain regularity and affects the purchasing decisions of cross-border e-commerce consumers over the years (Karthik and Velu, 2022). Therefore, the first step is to extract purchasing behaviour habits features, which are implemented using factor analysis methods. Extract habitual features of this type of consumer by analysing their purchasing information.

Set the cross-border e-commerce product information set as:

$$A_i = [a_1, a_2, ...a_n] \tag{1}$$

In formula (1), A_i represents the cross-border e-commerce product information set, and a_1, a_2,… a_n represents the data composition in the quality set.

Extracting the purchasing behaviour habits of cross-border e-commerce consumers through factor analysis method, the results obtained are:

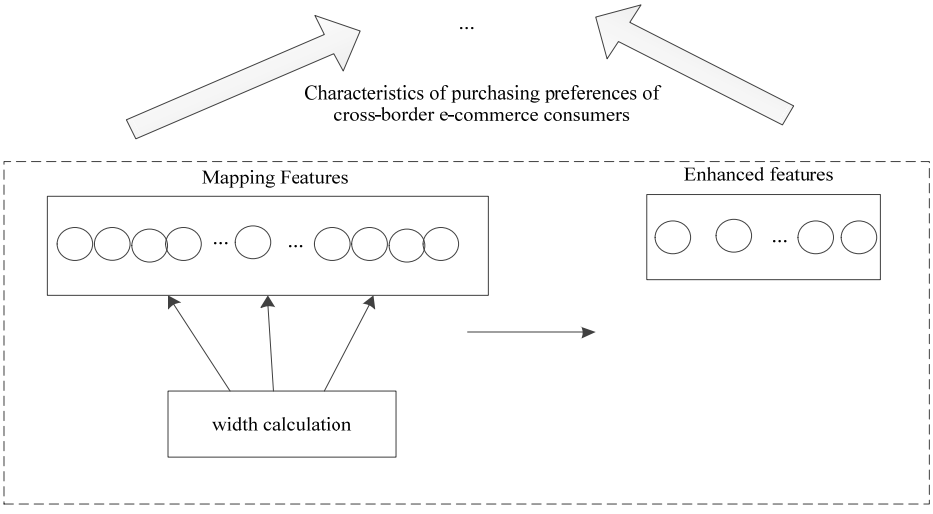
$$X_n = \begin{Bmatrix} x_1 = a_1 f_1 + a_{12} f_2 + ...a_{1k} + f_n \\ x_2 = a_2 f_1 + a_{22} f_2 + ...a_{2k} + f_n \\ \cdots \\ x_n = a_{p1} f_1 + a_{p2} f_2 + ...a_{pk} + f_n \end{Bmatrix} \tag{2}$$

In formula (2), X_n represents the extracted purchasing behaviour habits of cross-border e-commerce consumers, f_1 represents the common factors of cross-border e-commerce

products, a_{p2} represents the load of habit feature factors, and k represents the common feature factors.

The purchasing preferences of cross-border e-commerce consumers are also a key influencing factor on the purchasing behaviour of current buyers. There is a fusion between this feature and the aforementioned habitual features, but there is a significant difference (Rausch and Kopplin, 2021). The purchasing preferences of cross-border e-commerce consumers are strongly influenced by the current changes in cross-border e-commerce products, and consumers may make choices due to temporary trends when making purchases. Therefore, the extraction of this feature is also crucial. Select the width learning algorithm for feature extraction. In the application of this algorithm, the ultimate research goal is mainly achieved by mapping and enhancing features. The model structure of this algorithm is shown in Figure 1.

Figure 1 Schematic diagram of width learning extraction model



As shown in Figure 1, this algorithm converts the purchasing preferences of cross-border e-commerce consumers into mapping features, and then transforms the mapping features into enhanced features. Set the training set data matrix input to this model as:

$$X = \{x_1, x_2, ...x_n\}^{T \in R^i} \tag{3}$$

Set the training set data matrix for outputting this model as:

$$Y = \{y_1, y_2, ...y_m\}^{T \in R^i} \tag{4}$$

Assuming that the low dimensional features extracted by the model are k_i, the mapping features in the purchasing preferences of cross-border e-commerce consumers are represented as:

$$Z_i = \varphi(XW_i + B_i) \sum k_i \tag{5}$$

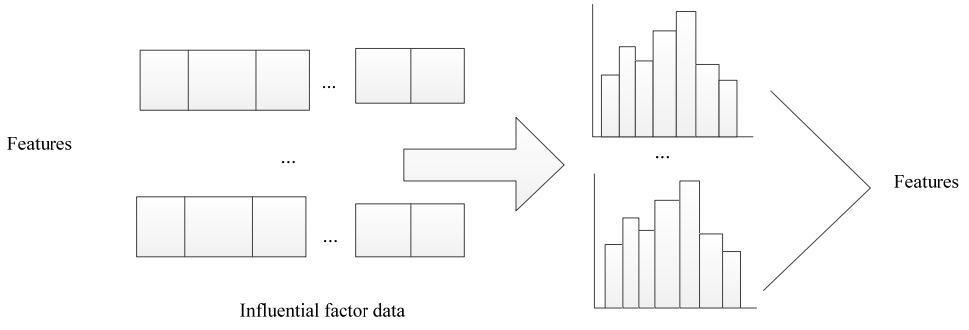
In the formula, Z_i represents the transformation matrix of the features input into the mapping matrix, W_i represents the corresponding bias term, and B_i represents the low rank term after dimensionality reduction.

On this basis, the enhanced features extracted from the purchasing preferences of cross-border e-commerce consumers are represented as:

$$Z_j = s\left(h_m W_h + B_i\right) \sum k_i \tag{6}$$

In the formula, Z_j represents the mapping matrix from the mapped feature to the enhanced feature, W_h represents the corresponding randomly generated offset matrix, and h_m represents the activation function of the enhanced feature.

Figure 2 Social media platform orientation feature histogram



The characteristics of social media platform orientation in the purchasing behaviour of cross-border e-commerce consumers are also important features that enable them to make decisions. This feature refers to the value and satisfaction that products bring to cross-border e-commerce consumers in social media platform marketing, mainly including functional value, hedonic value, economic value, aesthetic value, and innovative value. Therefore, starting from the information value of these cross-border e-commerce products, this article explains and predicts consumer shopping behaviour based on the needs and desires of cross-border e-commerce consumers. When cross-border e-commerce consumers use social media marketing platforms to search for product information, they may be influenced by the value of the product and engage in shopping behaviour. The higher the level of recognition of product value by users on social media marketing platforms, the more positive shopping behaviour they have (Wang, 2021). This feature extraction is an abstract process that uses a histogram algorithm to construct a social media platform oriented feature map, assuming that all of these features are concentrated here. In this algorithm, by discretisation the continuous floating-point Eigenvalue of the original dataset into multiple integers, and according to the convenience of constructing the histogram for features, the discretisation value is used as the data index in the histogram, and the statistics under each index of the histogram are accumulated to find the optimal segmentation point of the feature (Zhou et al., 2021). The directional feature map of the constructed social media platform is shown in Figure 2.

In the feature extraction of social media platform oriented feature histogram, the feature data in this area can be directly discretisation, and the features in this area can be

optimised without additional processing (Fuller et al., 2021). The feature data result after discretisation is as follows:

$$\varphi_i = \frac{1}{k}\sum_{i=1}^{n} a_i / y \int \sigma_i \tag{7}$$

In formula (7), φ_i represents the discretisation result of social media platform oriented features, and σ_i represents the overall feature dispersion coefficient.

In the feature extraction of cross-border e-commerce consumers' purchasing behaviour, it is determined to extract the characteristics of cross-border e-commerce consumers' purchasing behaviour as habit features, purchasing preference features, and social media platform oriented features. Factor analysis, width learning algorithms, and feature histogram construction methods are introduced to achieve the feature extraction of cross-border e-commerce consumers' purchasing behaviour.

2.2 Research on preprocessing of purchasing behaviour characteristics of cross border e-commerce consumers

After extracting the purchasing behaviour characteristics of cross-border e-commerce consumers under social media marketing, due to the presence of many similar data, it cannot be directly used for accurate prediction of cross-border e-commerce consumers' purchasing behaviour under social media marketing. Therefore, pre-treatment research is needed. Before achieving accurate prediction, it is necessary to remove these similar factors to reduce duplicate predictions of data and affect the efficiency of prediction. In this similar data removal, Euclidean distance (Yan et al., 2021) is calculated to measure the removal of these similar data. A smaller distance indicates a higher degree of similarity, and these higher degree data can be removed.

Randomly select the above purchasing behaviour characteristic samples and select sample data, and set the initial centroid set of these data to be represented as:

$$A = \{a_1, a_2, \ldots a_k\} \tag{8}$$

In formula (8), A represents the initial centroid set of purchase behaviour feature samples, a_1, a_2,… a_k represents the composition of the data, and k represents the number of initial centroid data for the feature samples.

Calculate the distance from the remaining sample data in the above set to the centroid (Adebayo and Kongar, 2021), and divide it into the classes to which the minimum distance centroid belongs, to obtain the sample class. For each category of data, calculate the centroid to obtain:

$$a_i = \frac{1}{|a_i|}\sum_{y \in a_i} y \tag{9}$$

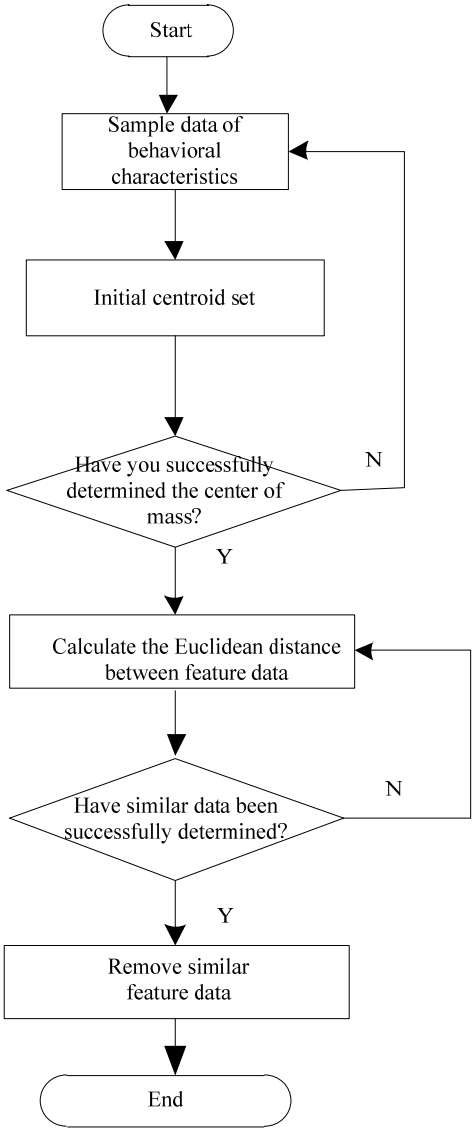
In formula (9), a_i represents the distance from the remaining feature data to the centroid, and y represents the minimum distance value.

Finally, calculate the Euclidean distance between feature data and determine similar data, resulting in:

$$\omega_{\max} = \frac{\sqrt{(a_i - a_k)^2 - (a_i + a_k)^2}}{\sqrt{(a_i - a_k)^2}} \tag{10}$$

In formula (10), $\omega_{\max}$ represents the maximum Euclidean distance between feature data.

Figure 3 Pre processing process for purchasing behaviour characteristics of cross-border e-commerce consumers



Finally, the determined similar feature data is removed and the resulting result is represented as:

$$R_i = \frac{1}{m}\sum_{i=1}^{n} a_i / \omega_{\max} \sum y \tag{11}$$

In formula (11), R_i represents the removal result of similar feature data, and m represents the amount of similar feature data removed.

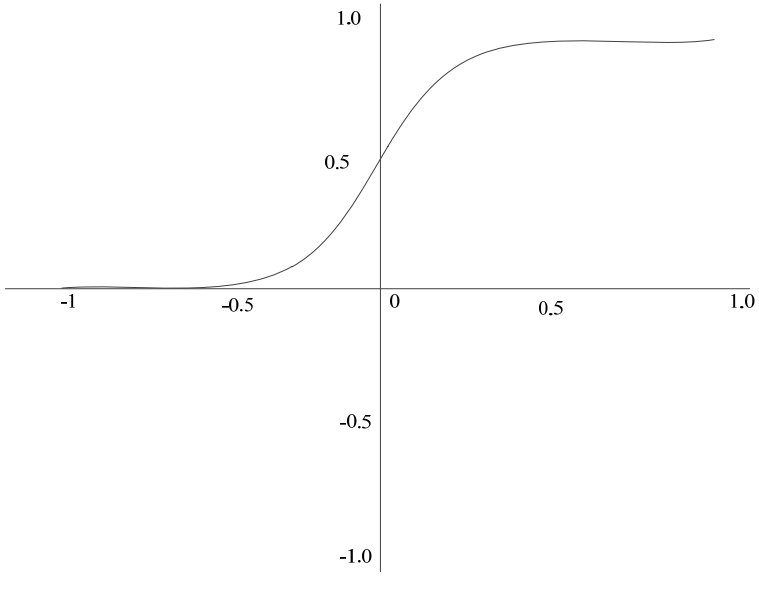
The preprocessing process for purchasing behaviour characteristics of cross-border e-commerce consumers is shown in Figure 3.

In the preprocessing of cross-border e-commerce consumer purchasing behaviour features, randomly select sample data of purchasing behaviour features, determine the initial centroid set of feature data, calculate the Euclidean distance between feature data, determine similar data, and remove similar data to achieve cross-border e-commerce consumer purchasing behaviour feature preprocessing.

2.3 Accurate prediction of cross-border e-commerce consumer purchasing behaviour under social media marketing

Based on the above determined feature extraction and preprocessing of cross-border e-commerce consumer purchasing behaviour under social media marketing, in order to achieve accurate prediction of cross-border e-commerce consumer purchasing behaviour. This article classifies the purchasing behaviour characteristics of cross-border e-commerce consumers mentioned above, removes similar influencing factors of purchasing behaviour, extracts purchasing behaviour characteristics of cross-border e-commerce consumers, and achieves accurate prediction research of purchasing behaviour based on the extracted feature results.

Figure 4 Schematic diagram of the principle of logistic regression algorithm



Firstly, research on the classification of purchasing behaviour characteristics of cross-border e-commerce consumers under social media marketing. In this precise prediction,

the basis of its prediction is based on the purchasing behaviour characteristics of cross-border e-commerce consumers under social media marketing. However, due to the large variety and scale of these influencing factors, it is difficult to directly predict based on the data of these influencing factors. Therefore, firstly, this article conducts classification research on it. In this classification study, logistic regression algorithm was used to achieve this. The classification method of this algorithm is simple and fast, with strong generalisation ability for data. The purchasing behaviour characteristics of cross-border e-commerce consumers under social media marketing are different from general data. In order to improve the feasibility of the algorithm, this article uses this algorithm to achieve classification. The basic principle of this function is shown in Figure 4.

The classification of this algorithm is actually a generalised linear model, which can be expressed as:

$$f(x) = Y\delta \tag{12}$$

In formula (12), $f(x)$ represents the linear regression prediction function in logical regression, Y represents the conversion mode of linear function, and δ represents the coefficient of linear regression prediction function.

Before using the linear regression prediction function for classification, it is necessary to output the results of the mapping area into the [0, 1] spatial range to achieve the binary classification function of influencing factors (Zhang, 2022), and obtain:

$$g(x) = \frac{1}{1+e^{-x}} \tag{13}$$

In formula (13), $g(x)$ represents the result of mapping the region, e represents the model parameters required for the solution, and x represents the input of sample influencing factors.

On this basis, the classification function of the design logic regression is expressed as:

$$h(x) = g(x)\delta\frac{1}{1+e^{-x\delta}} \tag{14}$$

In formula (14), $h(x)$ represents the classification results of purchasing behaviour characteristics of cross-border e-commerce consumers under social media marketing. When the value is greater than 0, it indicates that the classification results of behavioural influencing factors are more accurate. Otherwise, the above steps will be repeated.

Then, determine the weight of cross-border e-commerce consumer purchasing behaviour characteristics data. Due to the continuous changes in these influencing factors in social media marketing platforms, it is difficult to ensure that these characteristics remain unchanged (Ding et al., 2021). To achieve this, it is also necessary to ensure that the weights of these extracted features are high. In this weight calculation, it is determined by calculating the information entropy of the purchase behaviour characteristic data. The larger the value is, the higher the weight is, which means that the results will be more accurate in the subsequent prediction. The calculated information entropy is:

$$U(x) = \sum_{x=1}^{n}\left|\frac{c_i}{v}\right|\log_2\left\|\frac{c_i}{v}\right\| \tag{15}$$

In formula (15), $U(x)$ represents the weight entropy result of cross-border e-commerce consumers' purchasing behaviour characteristics, c_i represents the sample data of purchasing behaviour characteristics, and v represents the number of samples in the feature data.

Based on the known weight entropy results of cross-border e-commerce consumers' purchasing behaviour characteristics, in order to reflect the weight key habits of the dataset under more feature information, it is also necessary to calculate the information gain of the feature data, which can ensure the stability of these feature data on social media platforms. The calculation results are expressed as:

$$U(x)\left| A = \sum_{i=1}^{d} \left\| \frac{c_i}{v} \right\| U(x) \log_2 t_i \right. \tag{16}$$

In formula (16), $U(x) \mid A$ represents the information gain result of the feature data and t_i represents the information gain ratio.

Finally, construct a precise prediction model for cross-border e-commerce consumer purchasing behaviour under social media marketing. Based on the weight results of the feature data determined above, accurate prediction of cross-border e-commerce consumer purchasing behaviour is achieved. This article constructs a precise prediction model for cross-border e-commerce consumer purchasing behaviour under social media marketing, and introduces integrated learning algorithms to construct the model. Integrated algorithm is an important prediction algorithm in artificial intelligence algorithms, which has good prediction performance and can find the optimal solution in multiple predictions, ensuring the effectiveness of the prediction results. It is necessary to introduce a loss function into the algorithm. The result of the loss function is the smallest through continuous iteration of the function, that is, the prediction error is the smallest. There are:

$$q_{\min}(x) = L\left(y, q_{\min-1}(x)\right) + b_i(x) \tag{17}$$

In formula (17), $q_{\min(x)}$ represents the minimum result of the loss function, $L(\underline{y}, q_{\min-1}(x))$ represents the loss, and $b_i(x)$ represents the function of integrated regression model.

Using the minimum value of the above loss function results, the sample data with the highest weight value of cross-border e-commerce consumer purchase behaviour characteristics data is processed in a negative gradient to reduce the increase of interference items in the forecast. The results after processing are expressed as:

$$g(k) = -\left[\frac{q_{\min}(x)}{\partial L\left(y, q_{\min-1}(x)\right)} \right] b_i(x) \tag{18}$$

In formula (18), $g(k)$ represents the negative gradient processing result of the sample data with the highest weight value of cross-border e-commerce consumer purchasing behaviour characteristic data.

On this basis, a precise prediction model for cross-border e-commerce consumer purchasing behaviour under social media marketing is constructed to predict purchasing behaviour. The results obtained are as follows:

$$^{o}\mathrm{F}_i = \sum_{i=1}^{n} g(k) \sum_{k \in i} \frac{q_{\min}(x)}{\partial L\left(y, q_{\min-1}(x)\right)} \iint \vartheta_i \tag{19}$$

In formula (19), $^{o}F_i$ represents the output of the predicted results, and ϑ_i^{o} represent the integration ratio of the predicted results.

3 Experimental analysis

3.1 Experimental plan design

To verify the feasibility of the precise prediction method constructed in this article, an experimental analysis was conducted. In this study, a well-known domestic social media marketing platform was selected as the research object, and data on cross-border e-commerce consumers browsing and trading products in the past six months were obtained on this platform. Based on this, the characteristics of these consumers were analysed and accurate and effective prediction research was conducted. The specific experimental data of the study is shown in Table 2, 70% of the data is used as the training set, and 30% is used as the testing set.

Table 2 Experimental data

Parameter	*Content*
Number of cross-border e-commerce consumers	1,000
Number of views/day/time for the same product	0.5
Famous social media marketing platform	Douyin
Data capture interval/s	3
Quantity/piece of purchasing behaviour characteristic data	2,000
Operating system	Android
Prediction error/%	<1
Number of predictions	100

In this experiment, method in this paper, method of Li et al. (2021) and method of Li and Jie (2022) were compared to compare the reliability of cross-border e-commerce consumer purchase behaviour prediction and the similarity indicators of purchase behaviour influencing factors under social media marketing.

3.2 Experimental results

In the experimental testing, the credibility of method in this paper, method of Li et al. (2021) and method of Li and Jie (2022) in predicting cross-border e-commerce consumer purchasing behaviour under social media marketing was first analysed. The results obtained are shown in Table 3.

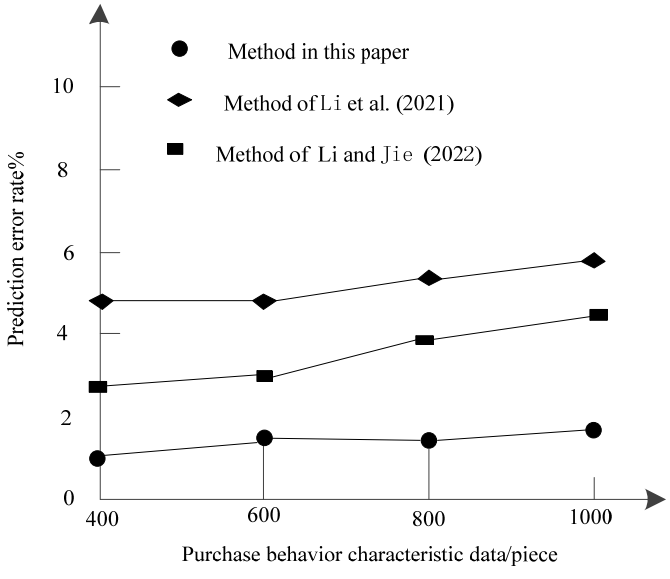
Analysing the test results in Table 3, it can be seen that there are certain differences in the reliability results of Method in this paper, method of Li et al. (2021) and method of Li and Jie (2022) in predicting cross-border e-commerce consumer purchasing behaviour under social media marketing. Among them, the credibility of method in this paper in predicting cross-border e-commerce consumer purchasing behaviour under social media marketing is consistently higher than the other two methods, with a maximum of about 99%. Compared to the three methods, this method has better performance.

Table 3 Reliability of cross border e-commerce consumer purchase behaviour prediction under social media marketing (%)

Number of predictions	*Method in this paper*	*Method of Li et al. (2021)*	*Method of Li and Jie (2022)*
20	99	95	90
40	99	90	87
60	98	90	85
80	98	87	82
100	98	85	80

In the experimental testing, further analysis was conducted on the prediction error rate of cross-border e-commerce consumer purchasing behaviour under social media marketing using method in this paper, method of Li et al. (2021) and method of Li and Jie (2022). The smaller the value, the better the performance of the method. The results obtained are shown in Figure 5.

Figure 5 Prediction error rate of purchase behaviour



Analysing the test results in Figure 5, it can be seen that as the amount of data on purchasing behaviour characteristics increases, the error rate of prediction for cross-border e-commerce consumers' purchasing behaviour under social media marketing has undergone certain changes in method in this paper, method of Li et al. (2021) and method of Li and Jie (2022). Among the three methods, the prediction error rate of Method in this paper was consistently lower than 1.5%, far lower than the experimental comparison method, verifying the feasibility of the proposed method.

4 Conclusions

In recent years, with the continuous development of internet technology and the rise of cross-border e-commerce, more and more consumers have started to purchase goods through the internet. At the same time, social media, as a new type of marketing channel, has gradually become one of the important means for enterprises to attract consumers. In this context, how to accurately predict the purchasing behaviour of cross-border e-commerce consumers, meet their needs, and improve marketing effectiveness has become a hot topic of concern for enterprises. Therefore, this article proposes a research on accurate prediction of purchasing behaviour of cross border e-commerce consumers under social media marketing, and the following conclusions are obtained through experimental analysis.

1 the reliability of the proposed method in predicting cross-border e-commerce consumer purchasing behaviour under social media marketing is as high as 99%

2 the prediction error rate of the proposed method has always been below 1.5%, verifying the feasibility of the proposed method

3 the proposed method can help enterprises better understand consumer needs and develop more precise marketing strategies to improve their market competitiveness.

Acknowledgements

2023 Henan Science and Technology Development Program (Soft Science) Project "Research on the power mechanism and path optimisation of cross-border e-commerce driven economic high-quality development in Henan under the background of 'double cycle'" (232400410438).

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