



Impact of Brand Marketing Strategies Based on Consumer Purchase Intention Mining

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Abstract. Brand marketing strategy refers to the enterprise in order to improve the brand image, popularity and reputation, and attract the target market and consumers. With the development of technology, enterprises began to explore how to use emerging technologies to enhance brand value and enhance consumers' willingness to buy. The combination of computer aided design (CAD) and virtual reality (VR) technology provides new opportunities for enterprises. In order to explore the influence of brand marketing strategy of CAD products based on VR on consumers' purchase intention, this article puts forward a prediction model of consumers' purchase intention based on user data mining (DM). By comparing the F1 value of this algorithm and ID3 algorithm in the task of predicting consumers' purchase intention, it is found that this algorithm has higher F1 value and stability. This proves the effectiveness and superiority of the consumer purchase intention prediction model based on user DM. By building a prediction model of consumers' purchase intention based on user DM, enterprises can predict consumers' purchase intention more accurately, so as to formulate more accurate brand marketing strategies and improve market share and brand value.

Keywords: CAD; Virtual Reality; Brand Marketing; Purchase Intention

DOI: <https://doi.org/10.14733/cadaps.2024.S12.205-219>

1 INTRODUCTION

In the current business environment, brand marketing strategy has become an important means for enterprises to gain competitive advantage. Traditional brand marketing strategies mainly rely on traditional media and channels such as advertisements and promotional activities, but with the development of technology, enterprises began to explore how to use emerging technologies to enhance brand value and enhance consumers' willingness to buy. With the rapid development of technology, virtual reality technology has become one of the most forward-looking technologies today. In the research of virtual reality, marketing research occupies an important position. As an emerging field of marketing research, immersion/fantasy typology has significant implications for marketing strategies in virtual reality. Cowan and Ketron [1] explored the application of

immersion/fantasy typology in virtual reality and delved into its value in marketing research. In virtual reality, immersion/fantasy typology is mainly applied in user research, user experience, and marketing strategies in the virtual world. Firstly, through research on immersion/fantasy typology, it is possible to better understand users' needs and behaviors, thereby developing more precise marketing strategies. Secondly, immersion/fantasy typology can help businesses improve the user experience of virtual worlds, thereby increasing user loyalty and satisfaction. Finally, immersion/fantasy typology can also provide innovative marketing tools for enterprises, such as creating an immersive brand experience through virtual reality technology, thereby deepening users' awareness and favorability towards the brand. The combination of CAD and VR technology provides new opportunities for enterprises. CAD technology can help enterprises to design and optimize products, while VR technology can let consumers experience the benefits and feelings brought by products in virtual environment. Hasan and Sohail [2] focused on exploring the impact of social media marketing on consumer purchasing decisions, with a particular focus on the different roles of local and non-local brands. The survey results show that social media marketing has a significant impact on consumer purchasing decisions. Specifically, local brands have high competitiveness in social media marketing, as consumers tend to choose local, reputable enterprises.

In addition, consumers refer to user reviews and word-of-mouth on social media during the purchase decision-making process, which further confirms the importance of social media marketing. Therefore, the brand marketing strategy of CAD products based on VR may have a positive impact on consumers' purchase intention. Most of the existing studies mainly focus on one aspect of brand marketing strategy, such as price, brand image, product characteristics, etc., and pay less attention to how to use CAD and VR technology to enhance brand value and consumer purchase intention. In addition, consumers' purchase intention is a complex process influenced by many factors, and the prediction model of consumers' purchase intention based on user DM can better understand and predict this process. Therefore, this article will discuss the influence of brand marketing strategy of CAD products based on VR on consumers' purchase intention, and build a prediction model. Li et al. [3] introduced a method for analyzing customer features and attributes using machine learning techniques such as decision trees, clustering analysis, and Naive Bayes algorithm, as well as how to select models with high promotion levels through promotional graphs. These technologies can help enterprises better understand customer needs, identify potential market opportunities, and improve marketing effectiveness. With the continuous development of technology, the application of machine learning technology in the business field will become increasingly widespread. A promotional chart is a model that graphically displays the impact of promotional activities on sales and customer satisfaction. By selecting appropriate promotional strategies, enterprises can increase sales and customer satisfaction, and achieve performance growth. When selecting a model with a high degree of promotion, we need to comprehensively consider the impact of promotion strategies on sales and customer satisfaction. Generally speaking, increasing sales while reducing customer satisfaction requires finding a balance between the two. By utilizing machine learning technology, enterprises can better choose promotional strategies and achieve a win-win situation between sales and customer satisfaction.

Luo et al. [4] proposed an enhanced mining model based on machine learning methods. The model mainly includes steps such as data collection, data preprocessing, feature extraction, and model training. Firstly, we collected sales data and customer review data of refrigerators from large e-commerce platforms. Then, we preprocess the data, including data cleaning, null filling, and standardization processing. Through online e-commerce and machine learning methods, we have successfully constructed an enhanced mining model, achieving effective exploration of the energy-saving refrigerator market. This model not only improves the grasp of market trends, but also provides refrigerator manufacturers with a more accurate target user group division. At the same time, this model is also expected to provide some reference and reference for exploration in other fields. However, although our model has achieved good results, it still needs to be adjusted and optimized according to specific situations in practical applications. Consumer behavior mainly studies the influencing factors and mechanism of consumers' purchase intention from the

perspective of consumers' psychology and behavior; Marketing mainly studies how to improve consumers' purchasing intention through marketing strategies from the perspective of product, price, promotion and location. How to apply modern technology to brand marketing strategy and study the prediction model of consumers' purchase intention from the perspective of user DM is still an urgent problem. By deeply studying the influence of brand marketing strategy of CAD products based on VR on consumers' purchase intention, enterprises can understand consumers' demand and purchase behavior more comprehensively, so as to better grasp the market dynamics and competitive situation. Secondly, by building a prediction model of consumers' purchase intention based on user DM, enterprises can predict consumers' purchase intention more accurately, so as to formulate more accurate brand marketing strategies and improve market share and brand value. The purpose of this article is to explore the influence of brand marketing strategy of CAD products based on VR on consumers' purchase intention, build a prediction model of consumers' purchase intention based on user DM, and verify the accuracy and generalization ability of the model by using training set and test set. This research not only helps enterprises to better understand consumer demand and purchase behavior, but also provides theoretical basis and practical guidance for enterprises to formulate more accurate brand marketing strategies.

With the continuous development of technology, virtual reality technology has gradually integrated into every aspect of our lives. In the hotel industry, virtual reality advertising is gradually becoming a novel and effective marketing tool. Lyu et al. [5] explored the characteristics and patterns of hotel virtual reality advertising, as well as the impact of gender effects on it and specific application cases. Hotel virtual reality advertising is a form of advertising that uses virtual reality technology as a medium to simulate real hotel scenes and services, showcasing hotel characteristics and advantages to customers. Unlike traditional image and video advertising, virtual reality advertising can provide a more realistic and three-dimensional experience, making users feel like they are in a real hotel environment, thereby enhancing customers' willingness and loyalty to purchase. The user interaction interface for virtual reality advertising in hotels usually uses devices such as headsets and controllers, allowing users to browse the environment and facilities of virtual hotels from all directions and angles. This study can not only provide new ideas and methods for enterprises in brand marketing strategy, but also provide consumers with better shopping experience and service. At the same time, this study can also provide new ideas and methodology for the research in marketing, consumer behavior and other related fields. The research innovations are as follows:

(1) Combining CAD and VR technology, this article puts forward a brand marketing strategy of CAD products based on VR, which can better meet the needs of consumers and improve their purchasing intention.

(2) This article puts forward a consumer purchase intention prediction model based on user DM, which can mine useful information from a large number of user data, help enterprises to better understand consumers' needs and purchase intentions, and thus formulate more accurate brand marketing strategies.

(3) The brand marketing strategy of CAD products based on VR proposed in this article not only pays attention to the physical characteristics of products, but also pays attention to consumers' psychological experience. Combining brand image, consumers' perception and purchase intention can improve consumers' purchase intention more comprehensively.

The structure of this article is as follows:

Introduction: This article introduces the research background and significance of consumer purchase intention prediction model, and the influence of brand marketing strategy of CAD products based on VR on consumer purchase intention.

Model construction: This article expounds the realization process of consumer purchase intention prediction model based on user DM, including data preprocessing, feature detection, model construction and evaluation.

Analysis of experimental results: The model for predicting consumers' purchase intention has been tested for many times, and the experimental results have been analyzed in detail from the perspectives of accuracy and stability, which proves the superior performance of the model in predicting consumers' purchase intention.

Conclusion: The research content of this article is summarized, and it is pointed out that the consumer purchase intention prediction model based on user DM has important application value in the market trend prediction of virtual economy and the formulation of brand marketing strategy.

2 RELATED WORK

Social media technology has a positive impact on consumers' online purchasing tendencies. Social media can not only provide consumers with rich product information, but also promote communication and interaction between consumers. Meanwhile, some scholars have also noticed that gender may regulate the relationship between social media technology and consumers' online purchasing tendencies. For example, women are more inclined than men to seek shopping advice and share shopping experiences on social media. Mehnaz and Bhasin [6] used a questionnaire survey method to collect and analyze data from 1000 consumers nationwide. Firstly, we require participants to use social media, including frequency and duration of use. Secondly, we measured the willingness of participants to purchase online through a scale. In addition, we also controlled for variables such as age and education level. The research results show that social media technology has a significant positive impact on consumers' online purchasing tendencies. Specifically, the more time participants spend on social media, the more likely they are to engage in online shopping. Augmented reality technology has also shown great advantages in the decision-making process of clothing procurement. AR fitting technology allows consumers to see the effect of wearing virtual clothing on their phones or tablet devices, which helps to more intuitively determine whether it is suitable. In addition, VR display technology can display physical clothing in a virtual environment, allowing consumers to observe the details of clothing from different perspectives, improving the accuracy of purchase decisions. Quattelbaum et al. [7] analyzed the possibilities and limitations of virtual and augmented reality in clothing procurement decision-making processes. Virtual and augmented reality technologies require certain equipment support, such as high-quality displays, cameras, processors, etc. This may result in some consumers being unable to enjoy the convenience brought by these technologies due to high device costs. In addition, operating these devices also requires certain skills and knowledge, which may bring difficulties for some consumers to use.

With the increasing awareness of environmental protection among people, ecotourism has become an important branch of the tourism industry. When consumers choose ecotourism products, their purchasing decision-making process is influenced by multiple factors. Roseta et al. [8] used Portugal as an example to explore the determinants of consumer purchasing decision-making processes in the context of ecotourism. In terms of ecotourism, Portugal is renowned for its abundant natural resources and strict environmental regulations. Portugal's ecotourism products include various nature reserves, national parks, rural tourism, etc. These products not only satisfy consumers' pursuit of the natural environment, but also promote the sustainable development of the country's economy. Future research can further explore how to optimize these influencing factors through marketing strategies and product design to promote the development of the ecotourism market. Compared to traditional online stores, immersive virtual reality stores have a more realistic shopping experience, allowing consumers to have a deeper understanding of products and make purchasing decisions. However, research on shopper behavior in immersive virtual reality stores is not yet sufficient and further exploration is needed. Schnack et al. [9] used a combination of questionnaire survey and behavioral observation to collect shopping behavior data from a certain number of consumers in an immersive virtual reality store. The questionnaire survey mainly aims to understand consumers' attitudes and satisfaction with the virtual shopping environment, while behavior observation is used to record consumers' action trajectory, stay time, etc. in the virtual store. The survey results show that the majority of consumers are satisfied with

the shopping experience of immersive virtual reality stores. In terms of behavioral characteristics, consumers show strong browsing willingness in virtual stores, preferring to directly touch and manipulate products to understand product information. At the same time, consumers have shown strong interest in features such as 3D fitting rooms, believing that this helps to better judge whether the product is suitable for them. In addition, observation also found that some consumers are more inclined to communicate with store staff to obtain more product information and shopping suggestions.

Sousa et al. [10] discussed the impact of COVID-19 on the intention of tourism to adopt virtual reality. Through literature review and empirical research, it is found that the COVID-19 has had a serious impact on the tourism industry, which has led the tourism industry to seek innovation and change. Virtual reality (VR) technology, as an emerging way of tourism experience, provides new development opportunities for the tourism industry. This study adopts quantitative and qualitative research methods to collect and analyze relevant data. The results show that the COVID-19 has a significant impact on the intention of tourism to adopt virtual reality. This impact is mainly reflected in the following aspects: innovation in tourism experience, transformation in tourism marketing, and upgrading of the tourism industry. The impact of the COVID-19 on the tourism industry is mainly manifested in the following aspects: decreased tourism demand, limited tourism activities and frustration in the tourism industry chain. At the same time, the application of virtual reality technology in the tourism industry is also receiving increasing attention. Virtual reality technology can provide immersive travel experiences, allowing tourists to enjoy various tourism services at home, thus becoming an important direction for innovative development in the tourism industry. Timokhovich and Bulycheva [11] explored the impact of CAD and VR technologies on consumer purchase intention in brand marketing strategies through experimental methods. The results indicate that the application of these technologies can significantly enhance consumers' awareness, preference, and willingness to purchase products. In a fiercely competitive market environment, enterprises should attach importance to the application of CAD and VR technology in brand marketing strategies, in order to better meet consumer needs, increase their purchasing intention, and further expand market share. CAD technology can help enterprises design products more accurately based on market demand and consumer feedback. VR technology can provide consumers with a deeper understanding and experience before purchasing through product prototypes or models, thereby increasing their willingness to purchase. VR technology can provide consumers with an immersive experience, helping them feel the characteristics and advantages of the product before making a purchase. This experience not only helps to increase consumers' willingness to purchase, but also enhances the brand's reputation and image.

Wagner and Cozmiuc [12] explored how cloud platform as a service technology can carry extended reality and fusion technologies in integrated solutions. In integrated solutions, extended reality technology and fusion technology have many application scenarios. For example, using extended reality technology, enterprises can conduct virtual simulations during product design, development, and testing stages to reduce costs and shorten cycles. Meanwhile, fusion technology can integrate data from different systems onto a single platform, providing more comprehensive support for decision-making. In integrated solutions, cloud platform as a service technology can leverage its powerful data processing capabilities, high availability, and flexibility. In previous studies, scholars have conducted in-depth discussions on the impact of online shopping contextual cues on consumer purchase intention. These studies mainly focus on various elements in the online shopping context, such as website design, information quality, and merchant reputation. Although these studies provide us with a wealth of valuable information, there are still some unresolved issues. For example, how to introduce the concept of sustainability into online shopping scenarios, and how to increase consumers' willingness to purchase cross-border e-commerce from a sustainability perspective. Xiao et al. [13] explored the impact of online shopping contextual cues on consumers' sustainable purchasing willingness in cross-border e-commerce, and proposed corresponding conclusions and recommendations. The study adopts a combination of qualitative and quantitative methods to explore the impact of online shopping contextual cues on consumers' sustainable purchasing willingness in cross-border e-commerce. Yin and Qiu [14] explored how

artificial intelligence technology can influence consumers' online shopping intentions through perceived value. In consumer behavior research, perceived value refers to consumers' subjective perception of the overall value of a product or service. In the online shopping environment, consumers' perceived value mainly includes multiple aspects such as information value, security value, social value, economic value, and time value. These value factors affect consumers' purchasing decisions to varying degrees. Artificial intelligence technology can provide personalized recommendations, intelligent customer service, intelligent logistics and other support for online shopping platforms, thereby improving consumers' shopping experience and platform operational efficiency. In terms of personalized recommendations, artificial intelligence technology can infer users' interests and preferences by analyzing their browsing history, purchase records, and other data, and recommend more accurate products to them. In terms of intelligent customer service, artificial intelligence technology can automatically answer users' questions through natural language processing and machine learning technology, providing timely and effective pre-sales and after-sales services. With the popularization of the Internet and the rapid development of e-commerce, online mass customization websites have become increasingly popular shopping and service platforms. The experiential value and willingness to visit online mass customization websites are crucial for their success. Therefore, Zhang et al. [15] aimed to explore the impact of website design features on the experiential value and patronage intention of online mass customization websites. Collect data for analysis through questionnaire surveys and interviews. The design characteristics of websites have a significant impact on the experiential value and customer willingness of online mass customization websites. In order to improve the competitiveness and user satisfaction of online mass customization websites, website managers should focus on optimizing and improving website design features, including website interface design, information quality, interactivity, and other aspects. Meanwhile, in subsequent research, in-depth research can be conducted on online mass customization websites of different types and sizes to discover more targeted design optimization strategies.

3 METHODOLOGY

3.1 Analysis of Marketing Competitiveness

(1) Brand marketing strategy

Brand marketing strategy refers to a series of measures and means adopted by enterprises in order to improve brand image, popularity and reputation, attract target markets and consumers, and thus achieve the marketing objectives of enterprises. Traditional brand marketing strategies often pay attention to the physical characteristics and price of products, while ignoring the psychological experience and needs of consumers. Therefore, this article puts forward a brand marketing strategy of CAD products based on VR, which pays attention to consumers' needs and psychological experience, and improves the marketing effect of enterprises by improving brand image, consumers' perception and purchase intention.

(2) Consumer behavior

Consumer behavior is a discipline that studies consumers' psychology and behavior. It mainly discusses how consumers perceive, evaluate and buy products. The study of consumer behavior shows that consumers' purchasing intention is influenced by many factors, including product attributes, price, brand image, word of mouth, consumer demand and so on. Therefore, the brand marketing strategy of CAD products based on VR proposed in this article also needs to consider these factors, so as to better meet the needs of consumers and improve their willingness to buy.

(3) CAD technology

CAD can help designers to design and manufacture products. Through CAD technology, designers can evaluate and optimize the design scheme more accurately and improve the precision and quality of product design. At the same time, CAD technology can also provide enterprises with

faster and more accurate product design and manufacturing services, so as to achieve more efficient production and better-quality products.

(4) VR technology

VR technology is a computer technology, which can provide users with an immersive experience by simulating real environments and scenes. In brand marketing, VR technology can provide consumers with more realistic shopping experience and scene simulation, so as to better meet consumers' needs and improve consumers' willingness to buy. At the same time, VR technology can also provide enterprises with more accurate target market positioning and personalized marketing strategies, so as to better achieve the marketing goals of enterprises.

Driven by big data, it is very important for enterprises to build an effective marketing competitiveness analysis model. These data include the company's own sales data, market research reports, industry analysis reports, etc., as well as competitors' sales data and market share. By analyzing these data, we can have a deeper understanding of market conditions, consumer demand and the advantages and disadvantages of competitors. Driven by big data, these data can be analyzed efficiently and accurately through technologies such as DM, machine learning and artificial intelligence. The analysis framework of marketing competitiveness based on big data is shown in Figure 1.

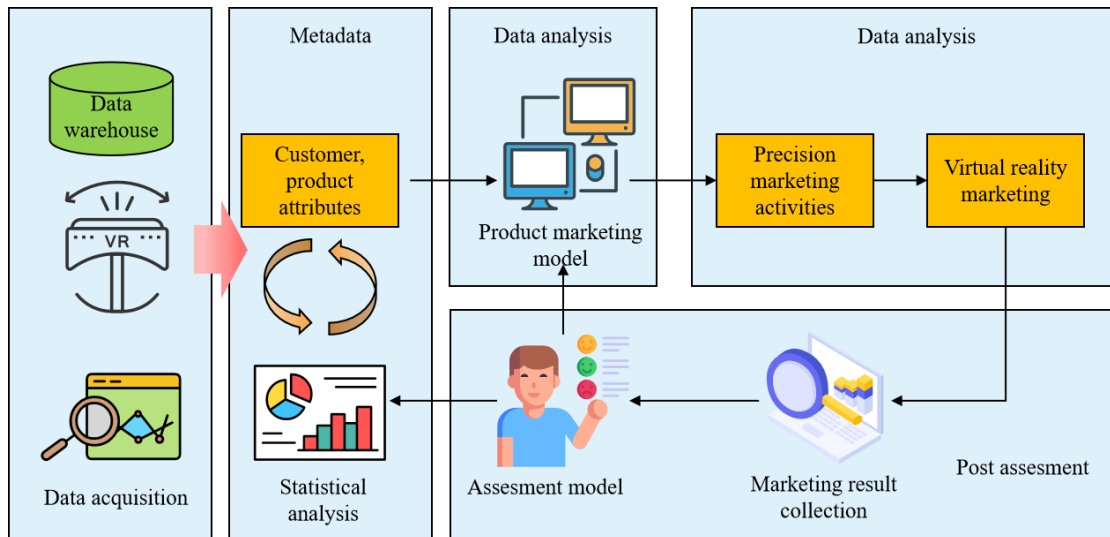


Figure 1: Analysis framework for marketing competitiveness based on big data.

Through cluster analysis, consumer groups can be divided into different market segments, so as to better understand the consumer needs and preferences of different groups. Through mining association rules, we can find the relationship between different products in consumer buying behavior, thus optimizing product mix and sales strategy. Through classified forecasting, consumers' purchasing intention and behavior can be predicted, so as to formulate more accurate marketing strategies.

Describe the weight w_{ij} word frequency TF of the CAD product attribute j in the CAD product i , and f_{ij} represents the number of times the element d_j appears in the document i . The frequency of element d_j in document i :

$$TF_{ij} = \frac{f_{ij}}{\max f_{ij}} \quad (1)$$

The inverse frequency IDF_j of the element d_j in the document set is:

$$IDF_j = \log_2 \frac{N}{n_j} \quad (2)$$

Define the feature degree w_{ij} of the attribute a_j in the product A_i :

$$w_{ij} = TF_{ij} * IDF_j \quad (3)$$

Scoring similarity $PSS(i, j)$ between items i and j can be defined as:

$$PSS(i, j) = \sum_{u \in U_{ij}} PSS_u(R_{ui}, R_{uj}) \quad (4)$$

Where U_{ij} represents the set of users who have evaluated both items i and j . $PSS_u(R_{ui}, R_{uj})$ represents the similarity of user u 's rating between items i and j .

When constructing the analysis model of marketing competitiveness, DM algorithm can be used to extract and analyze data. According to the results of the marketing competitiveness analysis model, we can get the competitive advantages and disadvantages of enterprises in the market, predict the future market trends and consumer demand, and formulate corresponding marketing strategies. In view of the disadvantages of enterprises, we can formulate strategies to improve products or services; In view of the future market trends and consumer demand, we can formulate targeted product development, sales and publicity strategies.

3.2 VR Marketing DM

Marketing DM can help enterprises better understand consumers' demand and purchase behavior, predict consumers' purchase intention, and improve brand value and market competitiveness. VR marketing DM can help enterprises better understand consumer demand and purchase behavior. By collecting and analyzing consumers' behavior data in the virtual environment, enterprises can understand consumers' interests and preferences, so as to formulate more accurate brand marketing strategies. For example, enterprises can understand consumers' purchasing decision-making process and purchasing preferences by analyzing consumers' browsing and purchasing behavior data in virtual stores, so as to better optimize product design and placement methods and improve consumers' purchasing willingness.

By analyzing consumer behavior data and enterprise marketing strategy data in virtual environment, enterprises can establish a prediction model of consumers' purchase intention and use the model to predict consumers' purchase intention. The process of VR marketing DM is shown in Figure 2.

When combining DM algorithm with the prediction model of consumers' purchase intention, it is needed to have a comprehensive understanding of consumers' consumption behavior at first. Consumer's consumption behavior includes purchase frequency, purchase quantity, purchase time, purchase place and many other aspects, which can be analyzed and predicted by DM algorithm. First, we need to preprocess the collected consumer data. Data preprocessing includes data cleaning, data integration, data transformation and other aspects, which can help us to deal with missing data, eliminate noise, simplify data structure and so on, making data easier to process and use. In the prediction of consumers' purchase intention, data preprocessing can include the

processing of missing values, the processing of abnormal values, the processing of duplicate data and so on.

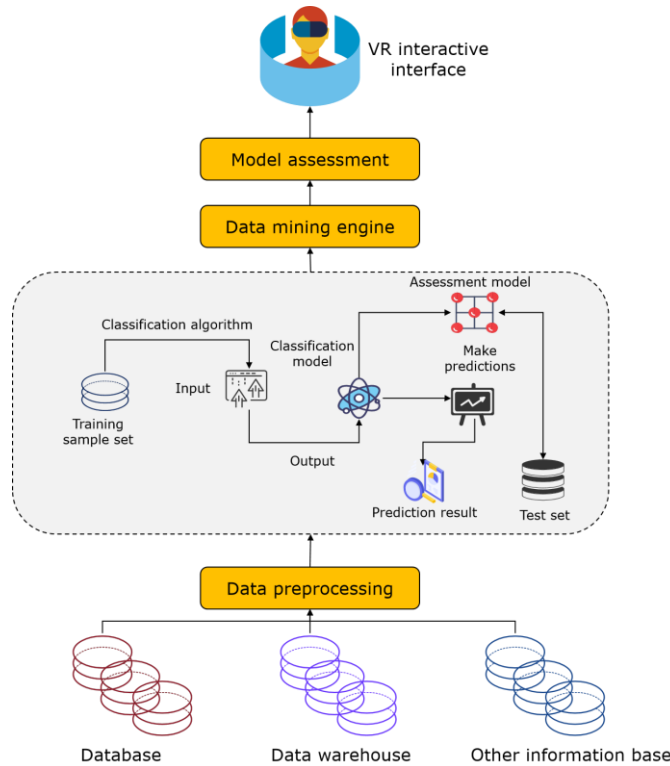


Figure 2: VR marketing DM.

By constructing derivative variables, merging variables and standardizing variables, the data falls in a specific interval, which enables modeling tools to process. Standardized range transformation: Subtract the minimum value of each transformed variable and divide it by the range.

$$x'_i = \frac{x_i - x_{\min}}{x_{\max} - x_{\min}}, i = 1, 2, \dots, n \quad (5)$$

Subtract the mean value of each standardized variable, then divide it by the standard deviation of the sample, and transform it into a data variable with a mean value of 0 and a standard deviation of 1 that conforms to the standard normal distribution.

$$x'_{ij} = \frac{x_{ij} - \bar{x}_j}{s_j}, i = 1, 2, \dots, n; j = 1, 2, \dots, m \quad (6)$$

After the transformation, the sample mean of each variable is 0 and the standard deviation is 1, and the standardized transformation data has nothing to do with the dimension of the variable. If it is not a continuous numerical variable, it needs to be converted into a continuous numerical variable. The conversion method mainly includes assigning discrete numerical values according to frequency distribution and performing extreme range conversion on them.

After data preprocessing, it is needed to extract features from consumer data. Feature detection refers to extracting features related to purchase intention from original data, which can

include basic information of consumers, consumption behavior characteristics, consumption preferences and other aspects. In the prediction of consumers' purchase intention, feature detection can include the processing of consumers' basic information, the statistics and analysis of consumer behavior, and the mining of consumers' preferences. After feature detection, it is needed to use DM algorithm to build a prediction model of consumers' purchase intention.

Combining the DM algorithm with the prediction model of consumers' purchase intention can be achieved through data preprocessing, feature detection, model construction, model evaluation and optimization. By using DM algorithm to analyze and predict consumer behavior, enterprises can better understand consumer demand and purchase behavior, formulate more accurate brand marketing strategies, and improve market share and brand value.

In fishbein model, the attitude of consumers to this specific object in the whole process is mainly predicted by the strength of consumers' belief in the performance of various attributes of products or brands. Fishbein model can be specifically described by the following formula:

$$A_0 = \sum_{i=1}^N b_i e_i \quad (7)$$

Support degree is the probability that a certain set (X, Y) appears in the total set I . As shown in formula (8):

$$\text{support}(X \rightarrow Y) = \frac{P(X, Y)}{P(I)} = \frac{P(X \cup Y)}{P(I)} \quad (8)$$

Confidence indicates the probability of deducing Y according to association rules under the condition of X event:

$$\text{confidence}(X \rightarrow Y) = P(Y | X) = \frac{P(X, Y)}{P(X)} = \frac{P(X \cup Y)}{P(X)} \quad (9)$$

The degree of promotion indicates the ratio of the probability of containing Y under the condition of containing X to the probability of containing Y without X :

$$\text{lift}(X \rightarrow Y) = \frac{P(Y | X)}{P(Y)} \quad (10)$$

By analyzing consumer behavior data and enterprise marketing strategy data in virtual environment, enterprises can formulate more accurate brand marketing strategies and improve market share and brand value. For example, enterprises can understand consumers' purchasing decision-making process and purchasing preferences by analyzing consumers' purchasing behavior data in virtual stores, so as to better optimize product design and placement methods and improve consumers' purchasing willingness and market share. VR marketing DM can help enterprises better understand consumers' demand and purchase behavior, predict consumers' purchase intention, and improve brand value and market competitiveness. Therefore, the research on consumer purchase intention prediction model based on user DM has important practical significance and theoretical value.

4 RESULT ANALYSIS AND DISCUSSION

In the research on the influence of brand marketing strategy of CAD products based on VR on consumers' purchase intention, it is very important to test the response time of the algorithm several times. Figure 3 shows the test results of response time.

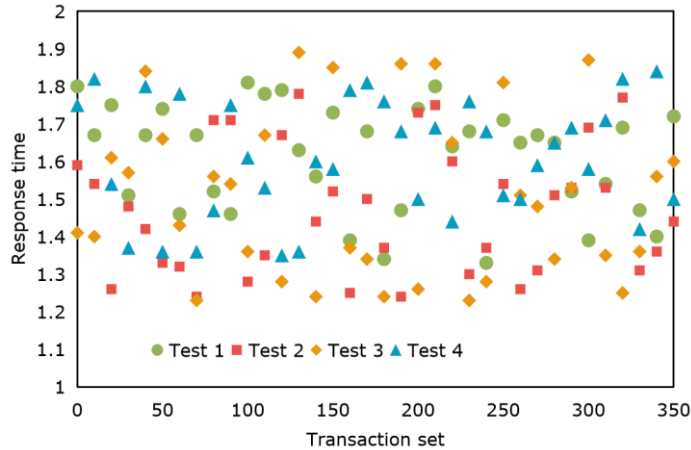


Figure 3: Test results of response time of the algorithm.

The results of the four experiments are different. This difference may come from many factors, including but not limited to: different data sets, selection of algorithm parameters, randomness and so on. Any slight difference may have a significant impact on the running time of the algorithm. Generally speaking, the response time of the algorithm is affected by its complexity. If the complexity of the algorithm is high, its response time may be longer. Conversely, if the complexity of the algorithm is low, its response time may be shorter. From Figure 4, we can see the performance comparison of the two algorithms in the task of predicting consumers' purchase intention.

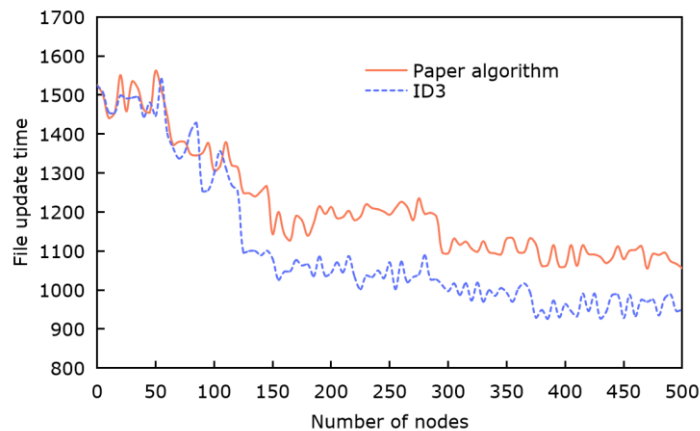


Figure 4: Comparison of algorithm update performance.

The updating performance of this algorithm is higher than that of ID3 algorithm. This shows that the algorithm in this article performs better on the specific task of consumer purchase intention prediction. The possible reason is that the algorithm in this article better understands the complexity and influencing factors of consumers' purchase intention, so as to predict the purchase intention more accurately. The updating performance curve of this algorithm is relatively more stable, which shows that the performance of this algorithm is more stable. The possible reason is that the algorithm in this article is more robust when dealing with noise and outliers in data. By comparing the performance of this algorithm and ID3 algorithm in predicting consumers' purchase

intention, it is found that this algorithm has better stability. This proves the effectiveness and superiority of the consumer purchase intention prediction model based on user DM.

From Figure 5 and Figure 6, we can see the comparison results of the prediction error and prediction accuracy of the algorithm in the task of predicting consumers' purchase intention.

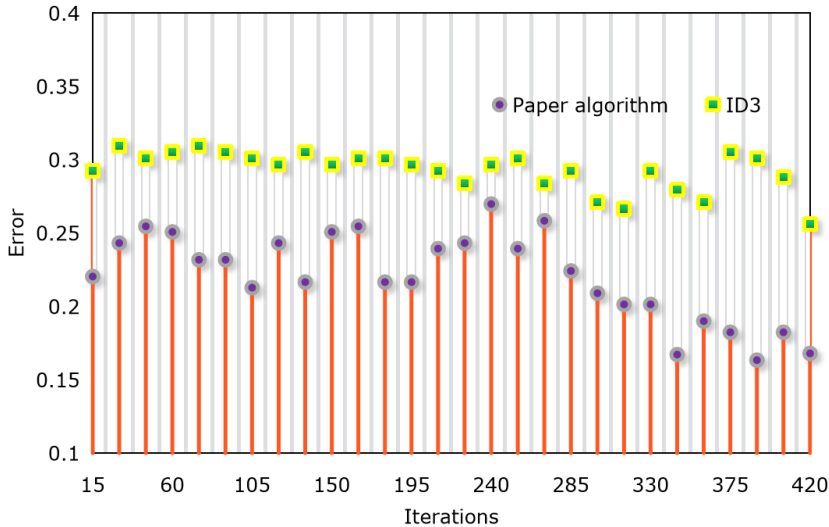


Figure 5: Error test.

The prediction error of this algorithm is smaller than that of ID3 algorithm. This shows that the difference between the actual results and the predicted results is small when the algorithm in this article predicts consumers' purchase intention. The possible reason is that the algorithm in this article can better understand and utilize the influencing factors of consumers' purchase intention in the process of DM, thus reducing the prediction error.

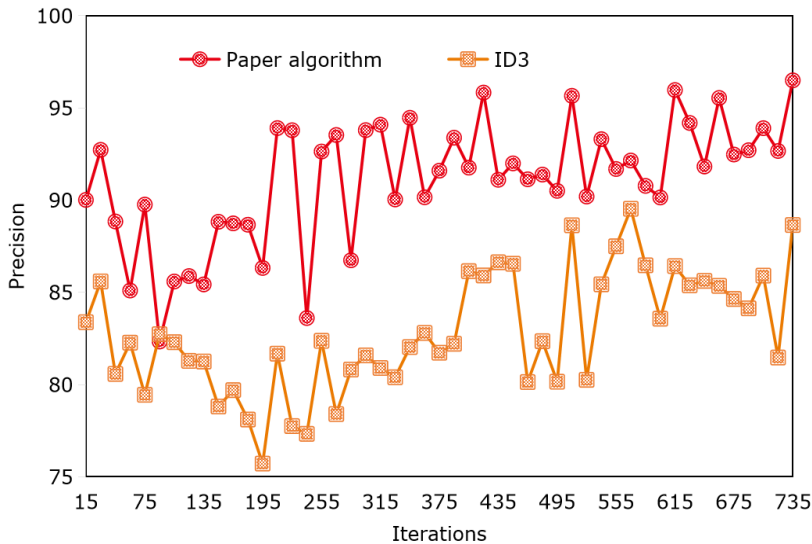


Figure 6: Accuracy test.

The prediction accuracy of this algorithm reaches 96.37%, which is much higher than ID3 algorithm. This shows that the prediction result of this algorithm is more accurate in the task of predicting consumers' purchase intention. The possible reason is that in the process of data preprocessing, feature detection and model construction, this algorithm can better grasp and utilize the characteristics and laws of consumers' purchase intention, thus improving the prediction accuracy. By comparing the prediction error and prediction accuracy of this algorithm and ID3 algorithm in the task of predicting consumers' purchase intention, it can be concluded that this algorithm has smaller prediction error and higher prediction accuracy. This once again proves the feasibility of the consumer purchase intention prediction model based on user DM. At the same time, it also shows that the model can better understand and utilize the influencing factors of consumers' purchase intention.

From Figure 7, we can see the comparison of F1 values of the two algorithms in the task of predicting consumers' purchase intention. F1 value is another important index to evaluate the performance of the prediction model, which combines the accuracy and recall, and can reflect the overall performance of the model more comprehensively. The greater the F1 value, the better the performance of the algorithm in predicting consumers' purchase intention.

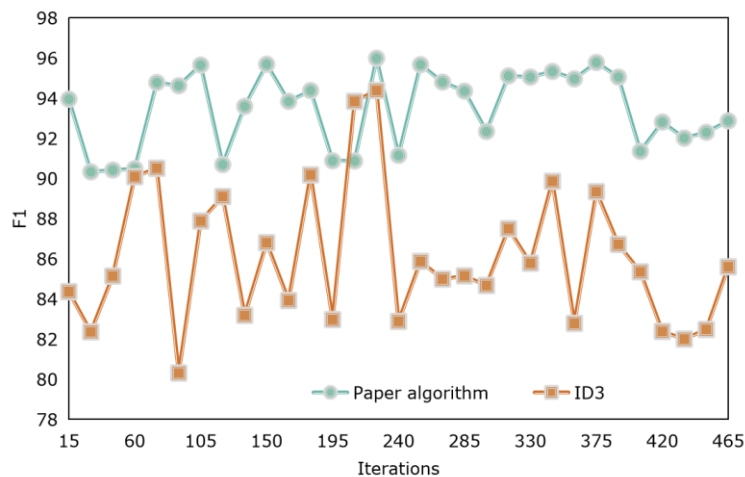


Figure 7: F1 comparison of different algorithms.

The F1 value of this algorithm is generally higher than that of ID3 algorithm. This shows that the algorithm in this article has better performance in the specific task of consumer purchase intention prediction. The possible reason is that the algorithm in this article better understands the influencing factors and complexity of consumers' purchase intention, so as to predict the purchase intention more accurately. By comparing the F1 value of this algorithm and ID3 algorithm in the task of predicting consumers' purchase intention, it is found that this algorithm has higher F1 value and stability. This proves the effectiveness and superiority of the consumer purchase intention prediction model based on user DM. At the same time, the value of F1 really shows that the model has a deep understanding of the market trend of virtual economy in real life, and can effectively predict consumers' purchase intention according to user data.

5 CONCLUSIONS

How to apply modern technology to brand marketing strategy and study the prediction model of consumers' purchase intention from the perspective of user DM is an urgent problem to be solved. CAD technology can help enterprises to design and optimize products, while VR technology can let

consumers experience the benefits and feelings brought by products in virtual environment. In the field of consumer purchase intention prediction, the prediction model in this article has higher prediction accuracy and stability than the traditional decision tree algorithm such as ID3. The prediction model of consumers' purchase intention studied in this article is excellent in dealing with the market trend of virtual economy, and can effectively predict consumers' purchase intention according to user data. The model adopts DM algorithm, which can extract the characteristics related to purchase intention from a large number of user data, so as to better understand consumer demand and purchase behavior. Secondly, the model combines VR technology, which makes the brand marketing strategy reach the target consumers more accurately, and improves the market share and brand value.

To sum up, the consumer purchase intention prediction model based on user DM studied in this article has important application value in the market trend prediction and brand marketing strategy formulation of virtual economy. In the future research, we can further expand the application fields of this model, such as studying the relationship between consumers' purchase intention and personal preferences, consumption habits and other factors, and exploring more efficient and stable DM algorithm.

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