Cosmetics Sales Data Classification Method of Japanese Cross-Border E-Commerce Platform Based on Big Data

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Abstract. Data analysis is playing an increasingly important role in the cross-border e-commerce platform in the cosmetics industry. Therefore, this paper proposes a cosmetics sales data classification method for the Japanese cross-border e-commerce platform based on big data. Taking the cosmetics sales data on the Japanese cross-border e-commerce platform as the research object, the development model of Japanese cross-border e-commerce and the connotation of cosmetics are expounded. Take targeted methods and measures; extract consumer purchase behavior characteristics on Japanese cross-border e-commerce platform, conduct in-depth analysis of customer relationship from three aspects: customer analysis, sales analysis and e-commerce platform analysis, and guide the behavior of maintaining customer relationship; Big data technology is used to predict the sales potential of cosmetics, determine the output according to the actual sales volume, and design the sales data classification model according to the characteristics of the data samples. Experimental results have classify the sales data, it is of great significance to the cosmetics sales of the e-commerce platform.

Keywords: Big data · Japanese cross-border e-commerce platform · Cosmetics sales · Data classification · Consumer · Sales potential

1 Introduction

The essence of cross-border e-commerce is an international business activity [1, 2]. The buyers and sellers of the transaction subjects come from different customs territories and complete the online communication, payment and other links of normal e-commerce activities through a common e-commerce platform. The difference is that the logistics links are carried out cross-border by international logistics companies. This is a very popular e-commerce model in modern society [3, 4]. Cross border e-commerce includes four elements: commodity logistics, enterprise talents, trading platform and commodity warehousing [5]. These four elements determine the advantages and disadvantages of the development of cross-border e-commerce enterprises. In Japan, cross-border e-commerce really began in the second half of the 1990s, and Lotte market began to operate in 1997. Three years later, Yahoo shopping was born. In 2000, Amazon began selling books in Japan and opened a cross-border E-commerce mall the next year. Due to the rise

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of cloud services that can build the company's cross-border e-commerce website at a low price, and the cross-border e-commerce market exceeded 5 trillion yen in 2005. During the first growth period (2001–2005), with the increase of cross-border e-commerce website users year by year, there were many consumer problems, such as operational errors. In order to solve this dispute, the electronic consumer contract was implemented in 2001. Amazon Japan began to sell in the form of "Amazon market plays". In the second growth period (2007–2009), in 2008, Amazon, a cross-border e-commerce enterprise exhibited on Amazon market plays, began to provide services from commodity custody to distribution function entrustment. In addition, in 2009 the next year, Amazon began to provide the same day delivery service, and Lotte market also began to provide the next day delivery service "easy tomorrow'. Because of the cooperation between the two large companies, cross-border e-commerce has entered the era of service competition, that is, "you can shop easily and deliver goods quickly". In the third growth period (2010 - present), in 2010, the so-called flash marketing coupon websites that can discount in joint purchase appeared one after another. First, in Japan's cross-border e-commerce enterprises, although there are constraints such as language but also a growth field, which may become the driving force of Japan's economic activation. The proportion of Japan (6%) is lower than that of the United States and China. On the other hand, compared with imported goods, Japan has a low sense of presence in purchasing cross-border e-commerce. The proportion of cross-border e-commerce buyers among online buyers in Japan is 5%. Compared with other major countries, all levels are low, and there is no progress in the use of cross-border e-commerce at the time of import. Second, the reason why Japanese users do not conduct cross-border e-commerce is that "it is enough on their own cross-border e-commerce websites", and half of the netizens are very satisfied on Japan's domestic websites. The second reason is the language barrier of "foreign language is very hard", the third reason is the worry of "return is very troublesome or return freight is relatively expensive", and the fourth reason is the speed of arrival of goods "because of the need for delivery date table" and "because of distrust of overseas cross-border e-commerce websites" This sense of distrust leads to a distance. At present, the academic research data on classifying big data technology and cosmetics sales data of Japan's cross-border e-commerce platform are not very rich.

Some scholars on e-commerce platform cosmetics sales data analysis method, document [6] in order to obtain micro consumer characteristics, based on marketing data, put forward a more micro sales data analysis, using K-means store classification and feature extraction, verify the relationship between the sales characteristics and actual sales, and on this basis, carried out the precise distribution recommended for retail stores.

Based on the above research literature, this paper proposes a cosmetics sales data classification method for the Japanese cross-border e-commerce platform based on big data.

2 Overview of Cross Border E-Commerce and Cosmetics in Japan

2.1 Development Mode of Cross-Border E-Commerce in Japan

In Japan, cross-border e-commerce is a commercial transaction between enterprises, families, individuals, the government and other public or private institutions. Its main forms are roughly divided into six types [7]. This form has the longest history and the largest transaction volume is inter enterprise transaction (B2B). B2B is widely used with the development of EDI and Internet. In addition to using EDI for orders, there are also enterprises that create shopping corners in their own company's websites and use B2B dedicated cross-border e-commerce websites. After B2B, the largest transaction volume is the computer of Japanese cosmetics enterprises and consumers (B2C). The transaction volume of B2C has also increased year by year. Consumers purchase goods and services on cross-border e-commerce websites, and the official website purchase of enterprises is also included in B2C. As other forms, consumers and governments also become suppliers. There are two forms of cross-border e-commerce in which consumers become suppliers: inter consumer transaction (C2C) and consumer to enterprise transaction (C2B). C2C refers to transactions between individuals, and C2B refers to transactions between individuals and enterprises, including transactions in which individuals accept translation work as freelancers. The forms in which the Japanese government becomes the supplier are also divided into government to enterprise transaction (G2B) and government to consumer transaction (G2C). Both refer to the government's services on the Internet and the electronic application of various applications. There are many advantages for Japanese cosmetics enterprises to engage in cross-border e-commerce, but the biggest advantage is that it is easier and cheaper to sell to a wide range of customers than ever before. If there is information about goods and services on the e-commerce platform and the environment for accepting orders is good, cross-border e-commerce will be established. In order to sell to overseas customers, sales can be carried out under different mechanisms from the past, such as local distribution of salespeople, establishment of sales bases and cooperation with agency stores, so as to greatly reduce the cost of developing new markets. Market Research and advertising can be carried out efficiently and at low cost. Based on the purchase records on cross-border e-commerce, the reading history of web pages, the flexible use of consumer action modes and other information, advertising is more efficient. The transaction volume of B2B in the world is more than 7 times that of B2C. However, 80% of enterprises with B2C growth rate exceeding b2bo replied that the development of B2C had an impact on the application of B2B cross-border e-commerce. Especially in the aspects of sales mode and consumers' way, B2C has a great impact on B2B.

2.2 Cosmetic Connotation

In today's era, cosmetics have become a necessity of people's daily life [8]. Cosmetics refer to daily chemical industrial products that are spread on any part of the human body surface (skin, hair, nails, lips, etc.) and decoration. According to the product classification standard. Cosmetics can be divided into skin care products, hair products, beauty products, cleaning products and other cosmetics [9, 10]. Product attribute refers to the collection of various characteristics of a product. It includes natural attributes and social attributes. Natural attributes mainly refer to the inherent properties and characteristics of products, such as product appearance, performance, etc. Social attributes refer to various characteristics formed after the product is integrated into the social category, such as brand characteristics. Brand identity is an important index to measure the online sales attraction of products. As far as cosmetics are concerned, their natural attributes include packaging and beautifying functions. Social attributes include the social recognition of its functions and the brand awareness of some cosmetics. From the natural attributes of products, the characteristics of small packaging volume and convenient storage and transportation of finished cosmetics are suitable for online sales. From the perspective of product social attributes, the use value of cosmetics is beauty, which can meet consumers' emotional needs. Selling cosmetics is not only a tangible product, but also an intangible service and the added value of a product. From the perspective of online sales, the sensory attraction of cosmetic functional effects and appearance characteristics to consumers is an important factor leading consumers to buy online. Generally speaking, products with visual impact are more conducive to online sales mode.

3 Cosmetics Sales Data Classification Method of Japanese Cross-Border E-Commerce Platform Based on Big Data

3.1 Extracting the Characteristics of Consumers' Purchase Behavior on Japanese Cross-Border E-Commerce Platforms

Due to the emergence of Japan's cross-border e-commerce platform, important changes are taking place in the consumption concept, consumption mode and consumer status of cosmetics audience, which makes contemporary consumer psychology present new characteristics and trends compared with the past. Only when enterprises and e-commerce platform vendors understand the demand characteristics of e-commerce platform consumers can they make better sales decisions [11–13]. In the past quite a long historical period, industry and Commerce served consumers as individual individuals. Only in modern times, the industrialization and standardized mode of production submerged the personality of consumers in the flood of a large number of low-cost and unitary products. However, no consumer's psychology is exactly the same. Psychological identity has become a prerequisite for consumers to make purchase decisions, and personalized consumption is and will become the mainstream of consumption [14, 15]. It is not only the personalized consumption of consumers that makes the consumption needs of e-commerce platforms different. Different e-commerce platform consumers have different needs due to different times and environments, and different e-commerce platform consumers have different needs at the same demand level. Therefore, in order to succeed in e-commerce platform sales, we must seriously consider this difference and take targeted methods and measures according to the characteristics of different consumers. Product is anything that can be used to meet some human needs or desires. Modern marketing concept believes that enterprises should provide products centered on customer needs. Cosmetics enterprises should understand their expectations for e-commerce platform sales in order to meet the needs of consumers by using platform sales. Knowing which attributes of e-commerce platform sales can affect consumers' acceptance of this model requires understanding the types of e-commerce platform consumers, their e-commerce platform purchase motivation and demand characteristics. Consumer research shows that different historical and cultural environments, especially different media environments, breed consumer groups in different times. The rise of the Internet has created a third new media. The popularization of platform media has spawned a new third generation of consumers, also known as consumers in the era of e-commerce platform. The research on the purchase behavior of consumers on e-commerce platform is the basis for e-commerce platform sales enterprises to improve customer service. To understand the main categories of e-commerce platform consumers, we must first understand the main types of online population. The types of online population can be divided into: simple type, surfing type, access type, bargaining type, regular type and sports type. What simple customers need is convenient and direct online shopping. We must provide real convenience for this type of consumers and make them feel that selling through e-commerce platform can save more time. Surfers are interested in websites that are constantly updated and have innovative design features. Access Internet users are novices who have just come into contact with e-commerce platforms. They rarely shop. Companies with famous traditional brands should pay enough attention to this group of potential consumers, because novices on e-commerce platforms are more willing to trust the brands they are familiar with in life. Negotiators have an instinct to buy cheap goods, so the low price feature of e-commerce platform sales can attract such people. Regular and sports e-commerce platform users are usually attracted by the content of the website. At present, the challenge faced by e-commerce platform enterprises is how to attract more Internet users and strive to turn website visitors into consumers. Through the analysis and Research on the consumer categories of e-commerce platform, it can be found that shoppers' purchase motivation and purchase behavior are of great value to e-commerce platform enterprises to improve services [16, 17]. In fact, it is obvious that the three most attractive factors for consumers of e-commerce platforms are convenience, wide range of options and low price. The purchase motivation of e-commerce platform consumers refers to some internal driving forces that can make e-commerce platform consumers produce purchase behavior in the purchase activities of e-commerce platform. Motivation is an internal psychological state, which is not easy to be observed or measured directly, but it can be understood and summarized according to people's long-term behavior or self statement. For enterprises, by understanding consumers' motivation, they can explain and predict consumers' behavior and take corresponding promotion measures. For e-commerce platform sales, motivation research is more important. Because e-commerce platform sales is an invisible sales, the complex, multi-level, intertwined and changeable purchase behavior of e-commerce platform consumers can not be observed directly, but can only be imagined and experienced through text or language communication. The former refers to people's purchase motivation caused by various needs, including low-level and high-level needs, while the latter is caused by people's psychological processes such as cognition, emotion and will. From the perspective of consumers, price is not the only factor that determines consumers' purchase, but it is a very important factor that consumers must consider when buying goods. For general commodities, there is often an inverse relationship between price and demand. For the same commodities, the lower the price, the greater the sales volume. Because e-commerce platform sales can reduce the intermediate costs and some additional information costs required by traditional retail, and reduce product costs and sales costs, the commodity prices sold by e-commerce platforms are generally low. Based on this, the steps to extract the characteristics of consumers' purchase behavior on Japan's cross-border e-commerce platform.

3.2 Big Data Technology Predicts Cosmetics Sales Potential

Big data refers to data sets whose size exceeds the acquisition, storage, management and analysis capabilities of conventional database tools [18]. But it also emphasizes that it does not mean that data sets that exceed a specific TB value must be considered big data. At present, most cosmetic stores in the market regularly make sales reports and sales analysis, which are generally divided into classified sales data summary reports by week, month, quarter and year. Sales forecasting is one of the important functions of data mining. Sales forecast refers to the estimated sales amount and sales quantity of all or some products in the future. It is the core part of sales plan. Sales forecast affects all aspects of sales management, including plan, budget and sales, which is not directly related to the scale of the enterprise and the number of salespeople. Sales forecast is a sales target put forward through relatively reliable analysis method on the basis of fully considering various factors that may affect the actual situation of the enterprise. Through forecasting, enterprises can determine the output according to the sales volume, so as to arrange production and avoid inventory backlog.

For sales personnel, they can mobilize their enthusiasm to achieve sales goals as soon as possible, and actively manage customer relationship according to customer churn prediction. For cosmetics sales enterprises, it is necessary to timely adjust the corresponding product inventory guarantee under different situations or events and the number of on-site workers at the sales point through the prediction method to market demand. These

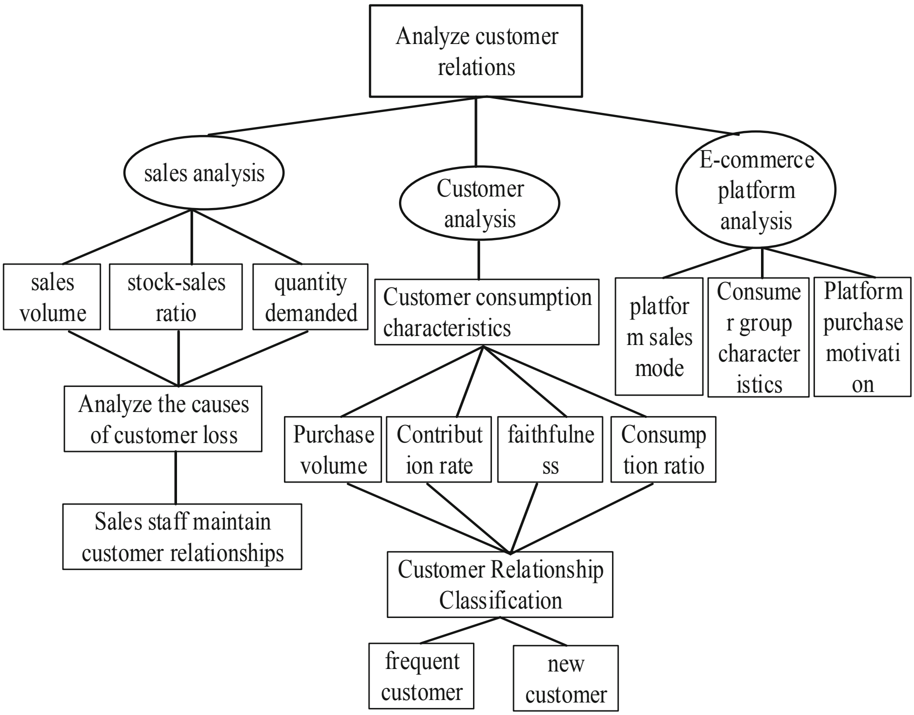

Fig. 1. The customer relationship data model.

information or knowledge may be hidden in a large number of original data and need to be extracted and analyzed by technology [19, 20]. The customer relationship data model. Are shown in Fig. 1:

As can be seen from Fig. 1, according to the cosmetics sales data, due to the relatively stable customer relationship, the purchase volume of old customers is far greater than that of new customers, reaching a contribution of more than 82%. After the background investigation of cosmetics, we found that the loyalty of old customers of high-end skin care series is higher. Their cultural level is relatively high, and they will not choose to buy skin care products aimlessly. Especially for the company's skin care projects, the proportion of re consumption of old customers is getting higher and higher. However, with the fierce competition and insufficient grasp of the market situation, the old customers of the cosmetics company also have a certain loss. According to the results, compare the completion of the scheduled plan and analyze the reasons for non completion. Predicting future sales, demand and so on through time series. Through sales analysis, you can understand the sales volume, sales inventory ratio, old customer contribution rate and other information. After subdividing the data, you can analyze the performance completion of salespeople. With the advent of the era of big data, the concept of cosmetics sales also needs to keep pace with the times. How to attract customers in the era of big data, accurately predict, predict inventory through big data marketing and maintain good customer relations have become the problems that some representative enterprises need to solve at present, and use big data to predict sales related situations to improve their coping ability, In order to better grasp the changing trend of the market, enterprises will better have customers and occupy the market. Based on this, complete the steps of big data technology to predict the sales potential of cosmetics.

3.3 Designing Sales Data Classification Mode

The characteristics of the cosmetics industry include periodicity, seasonality and regionality. Cosmetics are daily consumer goods. The development of the industry is in direct proportion to the national economic development and family disposable income. However, the proportion of residents' expenditure on cosmetics in their income is not high, so the periodicity of the industry is not obvious. In spring, the weather is humid, and there are a lot of dust and pollen mixed in the air, which is very easy to cause skin allergy. In particular, some people will feel itchy and peeling in this season, and there will be redness and swelling in serious cases. Therefore, the focus of skin care in spring is to prevent allergy. The summer weather is hot, the oil secretion of the skin is very strong, and the ultraviolet ray is also very strong. Therefore, in this season, skin care should pay attention to cleaning, oil control and sunscreen. Due to the extensive use of cosmetics, the demand for makeup removers will also show an upward trend this season. In autumn, the air is dry, so we need to replenishment. In addition to choosing some skin care products to replenishment, there will be more needs for replenishing the mask. The cold climate in winter accelerates the water loss of the skin, and the oil secretion is not as strong as that in summer. It is necessary to replenish water and appropriate nutrition for the skin. Seasonal commodities refer to commodities with obvious seasonal characteristics in production, purchase and sales, such as summer mats, winter supplements, agricultural and sideline products, etc. In order to ensure the normal supply of seasonal commodities in the market, enterprises generally purchase and reserve seasonal commodities in advance according to the characteristics of production and sales, and supply them to the market at an appropriate time. Although the seasonal sales characteristics of cosmetics are not as obvious as seasonal products, the sales volume of functional cosmetics will fluctuate with the seasons in different seasons. For example, lip balm and hand cream will be significantly higher in summer than in summer. Cosmetics sales are related to residents' income and consumption level. The market consumption in economically developed areas is relatively high, and that in eastern and coastal areas is higher than that in inland areas. The sales volume in the first tier and second tier areas is larger than that in other third tier and county-level areas. Women's demand potential for cosmetics is unlimited. Mastering customers' psychology and timely launching member services can not only promote secondary shopping, but also enhance customers' loyalty to products.

For consumers, buying directly from overseas manufacturers can ensure the quality of goods and can be bought cheaply. However, there are risks in the popularity of cross-border e-commerce. In cross-border e-commerce, because intermediary companies such as online stores are often used to circulate goods, goods may circulate in large quantities when manufacturers do not expect. As a result, there is also a price collapse in China. In addition, the system has not been improved. There may be urgent changes and restrictions in the future. In the case of cross-border goods trading, the way of "general trade" is usually adopted according to the inter enterprise transaction called B2B. As far as China's imports are concerned, trading companies and retail companies will enter the market before overseas sellers deliver goods to Chinese consumers. In contrast, "cross-border e-commerce" basically connects overseas sellers with domestic consumers in China. However, even for cross-border e-commerce with direct transactions, the cross-border movement of goods is the same as that of general trade. The difference between the two lies in the tax methods and procedures. When using cross-border e-commerce to import goods from overseas, there are two modes: "bonded zone mode" and "direct delivery mode". From the perspective of consumers, "direct delivery mode" is an international mail. The cycle from ordering to receiving goods is very long. The use of air transportation not only requires logistics costs, but also has problems such as difficult to accept after-sales service when there are problems with imitation products, defective products and other goods. In contrast, the "bonded area model" shortens the cycle from ordering to receiving goods, which can not only maintain the quality of goods, but also reduce the cost due to large-scale procurement and maritime use, which may be cheaper than the direct delivery model. For the original data to be analyzed, in order to determine whether the original variables are suitable for data analysis, we need to do the correlation analysis of variables. In the significance detection, the methods include double tail detection and single tail detection. The result of double tail detection is to compare whether there is significant difference between the two variables. Single tail detection is based on the size difference of variables when the directivity is known. In statistical analysis, the result of using double tail detection is more strict. Exponential smoothing method is a common method of time series analysis. It can be used to predict the medium and long-term development trend of a phenomenon. It is also one of the most frequently used prediction methods. The traditional full period average method makes equal use of all data and data from the past to the present, while the weighted moving average method gives greater weight to the recent data and data. The exponential smoothing method needs to weight the current actual observation value and the predicted smoothing value of the phenomenon, which is compatible with the advantages of the above two methods. The basic formula of exponential smoothing method is:

$$D = Qr + (1 - \varphi)_{r-1} \tag{1}$$

In formula (1), Q represents the time prediction value, r represents the actual measurement value, and φ represents the smoothing constant. According to the principle of exponential smoothing method, when the initial value of time is 1, formula (1) becomes the following form:

$$W = \alpha h + (1 - \varphi)_{\eta} \tag{2}$$

In formula (2), α represents predicted sales, h represents actual sales, φ represents smoothing constant, and η represents the number of multi class data samples. Multi classification problem is the most important branch in the field of data classification. It studies the data samples to be classified and extracts feature information to represent the data. In multi classification problems, category decision-making is a very important problem. It is the ultimate goal of classification problems. The quality of decision-making principles will directly affect the final classification efficiency. Decision function is a mathematical model that classifies the samples according to some characteristics of the data set through the analysis and research of the classified data. Then the data classification problem description is defined as:

$$L = \frac{1}{2}\left(l^{ij} \cdot k^{ij}\right) + \sum gij \tag{3}$$

In formula (3), l represents the numerical quantization result, k represents the minimum threshold, g represents the maximum threshold, and i, j represent the predicted and actual number of training samples of the objective function respectively. The most intuitive and commonly used method to solve the problem of unbalanced classification is to reduce the imbalance of data samples to be classified. Resampling methods include over sampling (up sampling) method and under sampling (down sampling) method. Oversampling method refers to increasing the number of minority training samples through certain principles. The initial oversampling method is simply to copy the minority training samples. This learning process sometimes leads to over learning, which is not significantly helpful to improve the classification accuracy of minority samples. Some improved methods choose to add some heuristic ideas to the sampling scheme and selectively expand some small class data samples. These methods have achieved satisfactory results in practical application. Under sampling method is to reduce the sample imbalance by reducing the number of multi class samples in unbalanced data samples. The commonly used methods to reduce multi class data samples include unilateral detection, large sample pruning, maximum (small) closed value processing, sample noise reduction, etc. Resampling method reduces the imbalance of training samples and improves the classification accuracy of small class data samples to a certain extent, but there are also some fatal problems, such as whether the new small class samples can fully characterize the characteristics of small class data without causing over learning, and whether the effective information can be retained in the process of multi class sample reduction. Based on this, complete the steps of designing sales data classification mode.

4 Comparative Experiments and Analysis

In order to verify whether the cosmetics sales data classification method of Japanese cross-border e-commerce platform can be actually applied, the test data selects 390M data in a Japanese cosmetics sales database of Japanese cross-border e-commerce platform and classifies it through the present method and document [6] method respectively.

The experiment doped the sales data and non-sales data, divided the overall data into 40 categories, 20 copies of the sales data and non-sales data, using two methods, and observed the classification results in Fig. 2:

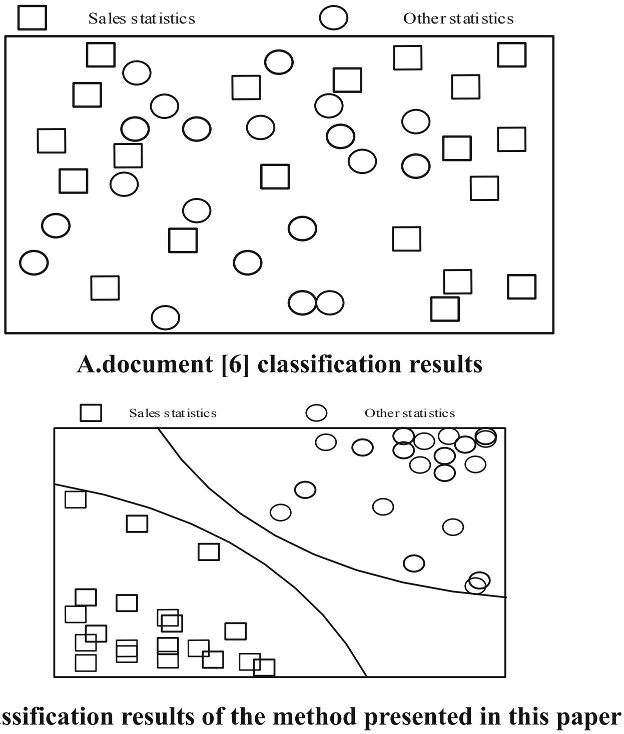

Fig. 2. Classification results for both methods

As can be seen in Fig. 2, this method divides the sales data to the left of Fig. 2(b), and the other data to the right of Fig. 2(b). However, literature [6] cannot distinguish the categories of data, reflecting that this method can distinguish sales data from sales data, and there is no unclear classification or misclassification, because this method can accurately excavate data attributes and links between projects, so as to achieve accurate classification.

5 Conclusion

The sales data used in this paper comes from the sales of new brand cosmetics in Japan on the e-commerce platform. Although this part of data can not represent the sales of all cosmetics enterprises, and the amount of data is not very huge, it can represent the sales of high-end health and skin care products. In order to study the sales characteristics in the big data environment, we combined the sales data of the store and external data sources such as weather, air quality and date type to extract and convert the data, and established the corresponding data classification model. Limited by the research conditions, the article has not studied the complex relationship of sample data thoroughly enough, and will continue to improve in the future.

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