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Research and Analysis of an Enterprise E-Commerce Marketing System Under the Big Data Environment

Linze Li, Management Engineering School, Capital University of Economics and Business, Beijing, China
Jun Zhang, Management Engineering School, Capital University of Economics and Business, Beijing, China

ABSTRACT

As an emerging online shopping method, e-commerce has been widely popular since the popularization of the internet. Online sales and online shopping have become the trend of modern business development. However, the functionality and performance conditions of the existing platform cannot be closely integrated with the merchant's own business. The purpose of this paper is to study the enterprise e-commerce marketing system based on big data. The system design of this paper adopts SSH framework as the main technology; the database selects HBase database, and the front end combines with Web2.0 technology for the interaction of interface display and operation. The experimental results show that applying big data technology to an enterprise e-commerce marketing system has extremely important practical significance. A performance analysis is performed on this system when the amount of data reaches 4,000, and the speed of HBase is 10.486s compared to the query time of Mysql at 50.184s. It can be seen that the HBase database query speed is much faster than the Mysql database query speed.

KEYWORDS

Big Data, Cloud Computing, E-Commerce Enterprise, Marketing System

1. INTRODUCTION

With the popularity and development of Internet technology, people are gradually accustomed to online shopping, from China's Taobao to Jingdong, from foreign eBay to Amazon, the development of e-commerce has already demonstrated the fact that people around the world are shopping online (Zaharia et al., 2016) . Traditional trade refers to the way of trading through offline, using telephone, fax, mail and face-to-face meetings to achieve a transaction between two people or two companies (Lv et al., 2015). Compared with e-commerce, traditional trade has shortcomings such as long trading cycle, high cost, asymmetric information, manpower and material resources, and narrow coverage (Obermeyer & Emanuel, 2016). Therefore, many companies have gradually shifted their business from traditional business to e-commerce. Since 2000, China's e-commerce has entered a period of vigorous development. The development of Taobao basically represents the development process of e-commerce in China (Andreu-Perez et al., 2015). Cross-border e-commerce is an important part of e-commerce (Wei & Ho, 2019). In a narrow sense, cross-border e-commerce is basically equivalent to cross-border retail, browsing through computers, having a satisfactory product after placing an order, electronic payment through the network, sellers through express, special line or postal registration packets way to carry out parcel transportation (Stevens, 2016). Broadly speaking, cross-border

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e-commerce is basically equivalent to foreign trade e-commerce, through online chat, electronic payment and other technical methods, many people in traditional export trade can meet with people to deal with issues such as product display, price negotiation, and commodities, the transaction and the payment link of the final order are realized electronically, and then the goods are transported by means of cross-entry logistics to achieve the purpose of the transaction (Wang et al., 2016). From 2005 to 2013, China's cross-border e-commerce has achieved vigorous development. In addition to the financial crisis in 2009, it has achieved substantial growth in other years, earning huge foreign exchange for China (Aanen et al., 2015).

Compared with traditional trade, e-commerce can be regarded as an emerging mode (Hjort & Lantz, 2016). At present, the companies engaged in e-commerce are mainly small and medium-sized enterprises, while the practitioners in the company are mainly below college education level, and their work is more about product uploading, pre-sales and after-sales customer service, packaging and delivery,without introducing some advanced technologies into e-commerce (Kim, 2019). The latest technologies, such as big data and cloud computing, are still in the research stage due to their recent launch, and are rarely applied in the emerging e-commerce field (Qiu et al., 2015). Many small and medium-sized enterprises are engaged in e-commerce, and the current marketing model mainly relies on the introduction of traffic in a very direct way, such as through train, but the final product, for a region, a country's analysis, almost no. According to relevant media reports, China's manufacturing industry is facing a cold snap, just after the financial crisis, China's manufacturing industry, although there has been a turnaround, but still difficult. The report points out that China's labor cost has risen nearly five times in the past 10 years. It is estimated that in the next 10 years or so, China's manufacturing industry based on labor cost advantage will no longer have any competitive advantage, and the manufacturing industry is likely to be overtaken by developed countries (Weber et al., 2015). On the one hand, there is excess capacity in many areas of China. On the other hand, many local governments and enterprises still produce by human input without technological innovation, which leads to a far backward technology compared with developed countries. Due to the continuous increase of labor costs, many enterprises are directly facing bankruptcy (Buckley et al., 2019). However, some experts are still optimistic about China's economy. On the one hand, the domestic manufacturing industry is undergoing transformation and upgrading to optimize the industrial structure. On the other hand, many enterprises are carrying out technological innovation(Chen et al., 2015). As more and more enterprises begin to engage in e-commerce for product sales, the industry is facing increasing pressure. The company's pursuit of sales performance drives the demand for marketing analysis (Soofi & Khan, 2017). The introduction of big data and the analysis of sales data are not only conducive to the improvement of the company's sales performance, but also conducive to the company's product positioning and further promote the transformation and upgrading (Bitam et al., 2015). Small and medium-sized enterprises do not have special funds for the maintenance of mainframe, database and other businesses with high technical content. The introduction of PAAS technology of cloud computing is conducive to greatly simplifying the business volume of the company, reducing the maintenance cost, accelerating the speed of system introduction, and helping enterprises to run to the forefront of the industry (Wang & Li, 2019).

The purpose of Andrea and his team is to identify and describe the most prominent areas of research related to Big Data and to provide a thorough definition of the term. They analyzed the compelling corpus of industry and academia articles related to big data to discover the commonalities between the topics being processed. They also produced a survey of existing definitions with a view to producing a more solid definition to cover most of the work that took place in the field. They found that the main themes of big data are: information, technology, methods and impact. They proposed a new definition of the term as follows: "Big data is an information asset characterized by such high quantity, speed and diversity that specific technologies and analytical methods are needed to convert it into value. "The practical significance is to make the development of the big data concept more coherent, because it relies only on the basic elements of the current state of the art and is consistent

with the most popular definitions currently in use. This is one of the first structuring attempts to build a compelling big data definition. It also contains original explorations of topics related to library management (Xiao et al., 2015). From the perspective of the difference in technology and value between perceived mobile commerce and Internet-based e-commerce, Cao and his team established a consumer transfer behavior model from online to mobile channels. Based on a sample of 323 respondents, they performed a logistic regression analysis. They found that technically perceptible differences, that is, perceived differences in end-user devices and communication networks, have a significant positive impact on the transfer of usage from online to mobile channels. They also found that perceived value differences (ie, perceived perceptions, perceived perceptions, and perceived differences in risk perception) significantly affected the shift in consumer usage from online channels to mobile channels. Among all factors, the impact of perceived differences in risk perception is negative. The management implications for practitioners and researchers were discussed to facilitate the transfer of consumers from online channels to mobile channels and to enhance consumer use of mobile services (Bei, 2017). Dejene and his team believe that cloud computing is an emerging paradigm that provides computing resources as a service over a network. Communication resources are often the bottleneck for many cloud application service offerings. Therefore, copying data (such as a database) closer to data consumers (such as cloud applications) is considered a promising solution. It allows for minimal network latency and bandwidth usage. They studied data replication in cloud computing data centers. Unlike other methods available in the literature, in addition to improving service quality due to reduced communication delays, they also consider the system's energy efficiency and bandwidth consumption. The results of the evaluations obtained during extensive simulations help to unravel the trade-off between performance and energy efficiency and guide the design of future data replication solutions (De Mauro et al., 2016).

The innovation of this paper may lie in the combination of big data technology and e-commerce. Based on the platform of integrated management marketing system and big data technology, big data in the field of e-commerce can be effectively analyzed and the query speed can be greatly improved. The experimental results show that it only takes 10.486s to query 4000 pieces of data with HBase database.

2.PROPOSED METHOD

2.1 E-Commerce

(1) The meaning of e-commerce

E-commerce refers to a series of trade activities that are achieved through electronic transactions on the Internet. Its operation mode is mainly realized by means of information network. The biggest feature is that it is not restricted by time and geographical. The original e-commerce refers to the activity of online shopping. However, with the continuous development of e-commerce, its scope is no longer included. It is only limited to online shopping, but includes information, logistics and other aspects.

(2) E-commerce model

E-commerce is constantly expanding itself in the process of continuous development. With the advancement of technology, the innovation of ideas, the mode is constantly changing. Until now, e-commerce has mainly developed the following modes: internal e-commerce, e-commerce between enterprises and consumers, e-commerce between enterprises and enterprises, and e-commerce between consumers and consumers.

1) Internal e-commerce

E-commerce within an enterprise is to isolate the internal network of the enterprise from the external network by setting a firewall so that it is not affected by the external network, thereby performing management of the enterprise, such as storing information on the internal server, sharing of internal information, as well as maintaining internal communications, can be achieved in this way. The main purpose of e-commerce within the enterprise is to transmit information efficiently, which can reduce the transmission cost and ensure its timeliness, and provide timely and effective information for the internal management of the company. The application of e-commerce within the enterprise has changed the way of management. There are many advantages and characteristics that traditional enterprises can't match. The characteristics are as follows: First, the way of information transfer has been changed, and the previous paper report has been transformed into the current electronic information. The organizational structure is also changing, from the previous pyramid model to the matrix model. In the past, the company reported it step by step, and the time was not mentioned. Once the risk occurred, the company may suffer losses. However, internal e-commerce expands the way employees contact the management and the communication is more convenient. Second, it helps to improve management efficiency, making management orders more efficient and efficient. Third, it will help reduce management costs and reduce the number of laborers. In turn, more funds can be invested in development and construction, and the profitability of enterprises can be improved. Fourth, for the information it stores. The management can view it at any time, making it easier to compare and make business adjustments, so that the cooperation between departments can be more coordinated and smooth.

2) E-commerce for business and consumers

That is, the B2C mode usually refers to online retail. Its basic operation mode is the platform for many enterprises to enter e-commerce. Consumers log on the platform website, select from them, then make online payment, and finally deliver goods through logistics distribution. B2C has three modes: the first one, the third-party platform type, as the name implies, the enterprise provides a platform for the enterprise to conduct transactions; the second, the third-party self-operated, that is, the enterprise not only provides platform support, but also needs to purchase goods. After picking and paying, the goods are delivered by logistics. The third type is the self-built model of the manufacturer. In this case, the enterprise is both the seller of the goods and the manufacturer of the goods. After the consumer chooses to pay, the logistics personnel will deliver the goods.

3) E-commerce between enterprises and enterprises

That is to say, the B2B mode enables enterprises to realize the trading activities of goods, information and services through the network. B2B mode can be divided into three forms: vertical, integrated and self-built. Vertical mode mainly refers to the mode of electronic transactions between enterprises and their suppliers and distributors. For example, as a manufacturer, they can cooperate with their upstream suppliers to find a good supply channel and also for their retailers. Increase its control over sales channels; the integrated model can also be called horizontal mode, which is characterized by the integration of the same type of enterprises, the more role is to provide a platform; the self-built model is generally the enterprise leader in order to integrate the entire industrial chain, puts its own suppliers and sales channels on a unified platform. However, one drawback of this model is the inability to deeply integrate the industry chain.

4) E-commerce between consumers and consumers

That is, in the C2C mode, consumers can buy and sell goods through the network. In the C2C mode, the network platform is actually the same as the intermediary. The "introduction" consumers know each other. The third-party platform only charges a small amount of commission, and once the purchase is confirmed, the process is similar to other modes, and the payment is completed on the network, and distribution is carried out by logistics. Of course, this model also has the commonality of e-commerce. It does not require the parties to deal with each other to face the transaction, nor is it limited by time and place, and as a seller can also save the cost of staff wages, venue rent and so on.

2.2 Big Data

(1) The meaning of big data

Big data is actually a cutting-edge new technology for data analysis. It mainly refers to the acquisition, screening, storage and analysis of huge kinds of data through huge database storage technology and fast information processing technology, and the ability to quickly mine valuable information from a variety of data.

(2) Characteristics of big data

Overall, big data has five major characteristics: hugeness, richness, value, speed, and accuracy. Because big data can achieve accurate analysis and research of data, it has greatly promoted in various fields, indirectly improving the level of China's production and construction and economic development. In the cloud computing environment, the capacity and architecture of big data are different. The applications mainly include the following three architectures:

First, the converged architecture. The converged architecture can integrate a large amount of data information and adopt corresponding optimization processes to improve the operability of the system. Such an architectural pattern is called a user/server model. The server can manage and integrate the system. Specifically, it manages and sets the programs, and judges and processes whether the data runs logically.

The second is a decentralized architecture. The most striking feature of this type of architecture is that it can distribute different modules in a more uniform form across different clients. In this way, the entire system can achieve a high degree of flexibility in its own self-control, while at the same time, its self-adjustment will be more convenient. Based on this, this type of architecture can also provide the escort power for the overall security of the system. However, there are also defects that cannot be ignored, that is, this architecture cannot provide data storage and data maintenance functions with high levels of effectiveness. In addition, when customers register under this architecture, they will encounter data errors and will not be able to complete the registration.

The third is a hybrid architecture. This type of architecture combines the advantages of both types. It relies mainly on servers when distributing and disseminating relevant data information. And when it is carrying out data interaction between different users, the main thing is the client.

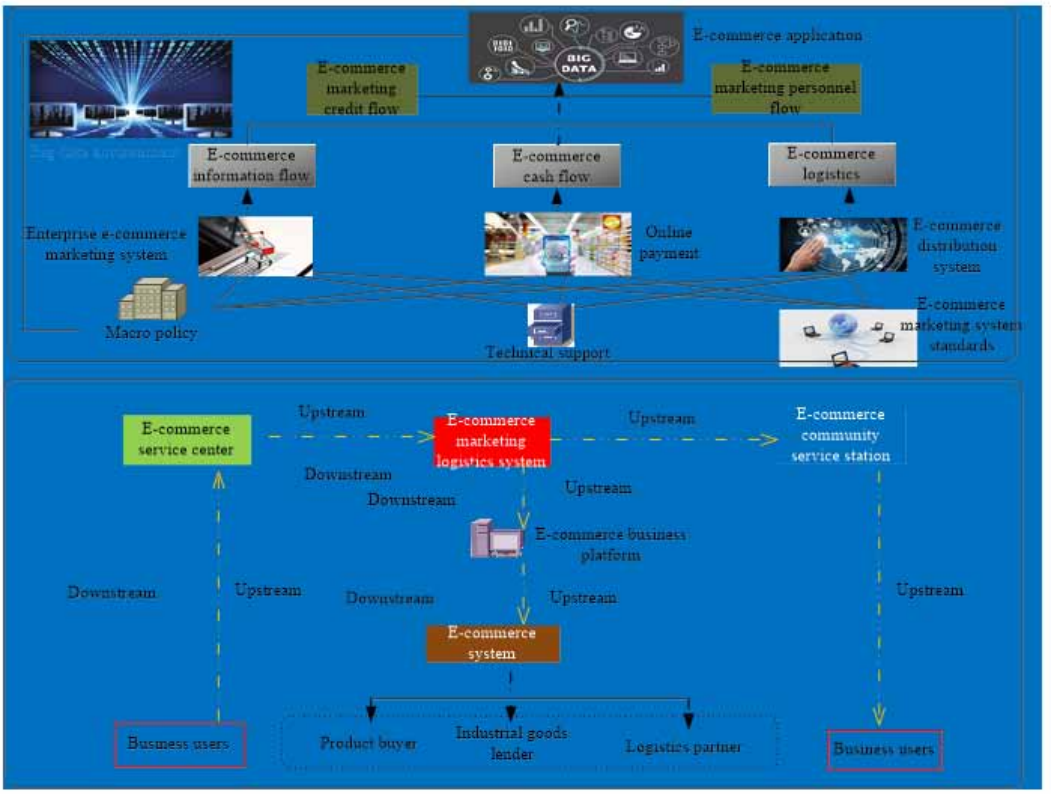
(3) Big data processing flow

The specific steps of the big data processing process:

The first step: data collection.

The concept of data collection, the current industry will have two explanations: First, data processing from scratch (logs printed by web servers, logs of custom collections, etc.) is called data collection; on the other hand, there is another use of Flume The process of collecting data to a specified location, called data collection.

Figure 1. Schematic diagram of enterprise e-commerce processing in big data environment



The second step: data preprocessing

The raw log data collected by the mapreduce program is preprocessed, such as clearing dirty data, sorting data formats, filtering out dirty data, etc., and combing to the clickstream model data.

The third step: data storage

The data pre-processed data will be imported into the corresponding libraries and tables in the database HIVE repository in the Hadoop ecosystem.

The fourth step: data analysis

The core content of the project is to develop ETL analysis reports based on needs and obtain various statistical results. Step 5: Data Presentation The data obtained from the analysis is visual and is usually displayed on the chart.

Schematic diagram of enterprise e-commerce processing in big data environment is shown in Figure 1.

(4) Big data related technology

1) HBase

HBase is based on Goole's BigTable database and adds a distributed, fault-tolerant, scalable database. Each HBase table is stored as a multidimensional sparse map, containing rows and columns, each unit has a timestamp, HBase has its own Java client API, and the tables in it can be used as input sources through Table Input/Table Output Format. HBase uses HDFS as the underlying file system,

designed for full distribution and high availability, but with different storage features than Hive for row updates and column indexing. HBase can perform real-time read and write and random access to very large data tables. Built-in scalability can be extended by adding servers to the cluster when the system is put into operation. Any scan result of the HBase table is a Map Reduce job. Parallel scan based on the Map Reduce job results can shorten the query response time and improve the overall throughput.

2) Hive

Apache Hive is a data warehouse infrastructure tool for processing structured data in Hadoop. It is similar to traditional relational databases in many ways. It maps structured data files to database tables and provides a convenient SQL query language for extract, transform, and load (ETL). Hive converts the query written by HiveQL into one or several Hadoop Map Reduce jobs, and then submits those jobs to the underlying Hadoop cluster to run. Hive contains a compiler and an execution engine. The compiler converts the query into a Map Reduce job, and the execution engine submits the job to the Hadoop framework. Since Hive is built on the Map Reduce programming model, it can be easily extended. It has great applicability and can query data directly from HDFS or HBase. It also supports user-defined query capabilities. With these advantages, Hive is widely recognized and widely used in the field of distributed computing.

3) Sqoop

Sqoop was developed for data migration between relational databases and the Hadoop platform. It is similar to other ETL tools for importing and exporting data from relational databases to the Hadoop platform, enabling users to migrate large amounts of data to the cloud. The environment is accessed through cloud technology.

4) Data warehouse

The Hadoop-based education big data platform requires the use of data warehousing technology, which is used to store and retrieve organized historical data to help predict and make strategic decisions. In other words, data warehousing is not just a large database; it is also a large, complex environment with many technologies integrated. One of the main benefits of using a data warehouse is the ability to store data in different dimensions (such as region, time, etc.) and at different levels of granularity, so it requires a lot of maintenance and management.

5) RNN cyclic neural network

Cyclic neural networks RNN are often used for the analysis of time series data. It loops by entering a value for each length of time and then predicting the value of the next point in time.

The main calculation formula for the internal structure of the RNN cyclic neural network is as follows:

$$h_t = f(x_t, h_{t-1}, w_x, w_h) = Sigmoid([w_x * x_t, w_h * h_{t-1}] + b_h) \tag{1}$$

$$y_t = f(h_t, w_y) = Sigmoid(w_y h_t + b_y) \tag{2}$$

x_t is the input value, h_{t-1} is the last hidden layer output value, w_x is the weight corresponding to the input, w_h is the weight corresponding to the last hidden layer output value, b_h is the offset value, y_t is the output Value, h_t is the hidden layer output value, w_y is the weight corresponding to the output value, and b_y is the offset value corresponding to the output value.

Given the learning data $X = \{X_1, X_2, ..., X_\tau\}$ entered in sequence, the expanded length of the cyclic neural network is τ. The sequence to be processed is usually a time series, in which case the evolution direction of the sequence is called "time-step". For the time step t, the cyclic unit of the cyclic neural network has the following representation:

$$h^{(t)} = f(s^{(t-1)}, X^{(t)}, \theta) \tag{3}$$

6) LSTM long-term and short-term memory network

LSTM improves the middle part of the cyclic neural network and uses the forgetting gate, memory gate and output gate to control the interaction of information. In the forgetting gate, the long-term information stored in the memory S is selectively deleted according to the current information, the output value is controlled between 0-1 by using $Sigmoid()$, and the unimportant information is deleted by setting it to 0. The information stored in the long-term memory S is selectively added in the memory gate based on the current information, and the output gate is based on the information stored in the updated long-term memory for final output.

The calculation formula for the Forgotten Gate is as follows:

$$y_{rf} = Sigmoid(w_f * [h_{t-1}, x_t] + b_f) \tag{4}$$

$$S'_{t-1} = y_{rf} * S_{t-1} \tag{5}$$

y_{rf} is the forgotten value of the forgetting gate, w_f is the weight of the forgotten gate, the offset value of the b_f forgetting gate, h_{t-1} is the short-term memory hidden layer, x_t is the input value of the current moment, and S'_{t-1} is the updated after the forgetting gate Long-term memory hidden layer, S_{t-1} is a hidden layer of long-term memory.

The calculation formula of the memory gate is as shown in the formula:

$$y_{rs} = Sigmoid(w_i, [h_{t-1}, x_i]) + b_i \tag{6}$$

$$S'_{t-1} = y_{rf} * S_{t-1}\ y_{rm} = \tanh(w_c, [h_{t-1}, x_i]) + b_c) \tag{7}$$

$$S_t^{'} = S_{t-1}^{'} + y_{rs} * y_{rm} \tag{8}$$

y_{rs} is the memory value of the memory gate output, w_i is the memory weight of the memory gate, b_i is the memory offset value of the memory gate, b_i is the memory gate memory information value, w_c is the weight of the memory gate, and b_c is the memory gate bias.

The calculation formula for the output gate is as follows:

$$y_r = Sigmoid(w_o \cdot [h_{t-1}, x_t] + b_o) \tag{9}$$

$$h_t = y_t = y_r * \tanh(S_t) \tag{10}$$

y_r is the output characteristic value for this time, w_o is the output gate weight, b_o is the output value of the prediction, and y_t is the value of the short-term memory hidden layer.

2.3 Cloud Computing

(1) Introduction to cloud computing

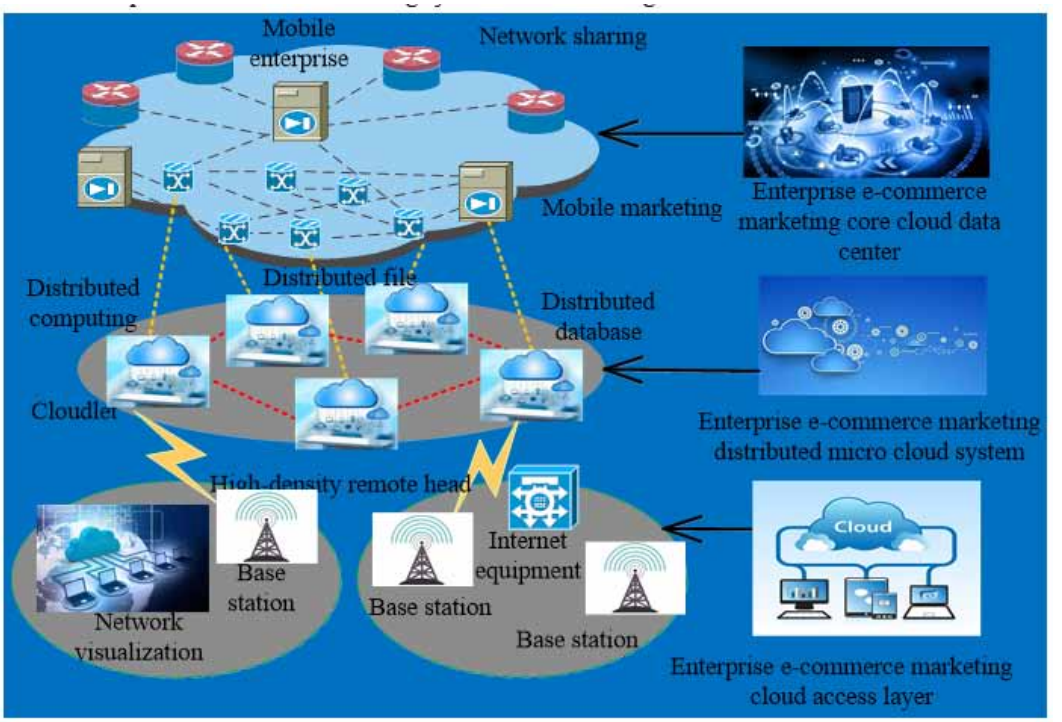
Cloud computing, the core of which is distributed computing through the network. Through this technology, the shared hardware and software resources and information materials are centrally managed and provided to computers and other devices as needed. Cloud computing is a kind of distributed computing technology. The most basic concept is to automatically split a huge computational processing program into a myriad of smaller subroutines through a network, and then transfer it to a huge system composed of multiple servers. After the search, calculation and analysis, the processing result is returned to the user.

(2) Cloud computing three-tier service architecture

Currently, cloud computing includes the following levels of services: Infrastructure as a service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). Hierarchical distributed cloud service enterprise e-commerce marketing system is shown in Figure 2.

In terms of services, it mainly provides users with various cloud-based services. There are three levels: one is Software as a Service, or SaaS for short. The role of this layer is to use the application mainly in the Web-based way. Provided to the customer; the second is platform as a service, referred to as PAAS, the role of this layer is to provide an application development and deployment Platform as a Service to the user; the third is Infrastructure as a Service, referred to as IAAS, the role of this layer is to provide various underlying computing (such as virtual machines) and storage resources as services to users. From the user's point of view, the three layers of services, the relationship between them is independent, different, because the services they provide are completely different, and the users are different. But from a technical point of view, the relationship between the three layers of cloud services is not independent, but has certain dependencies. For example, a SAAS layer of products and services not only need to use the technology of the SAAS layer itself, but also rely on the development and deployment platform provided by the PAAS layer is directly deployed on the

Figure 2. Hierarchical distributed cloud service enterprise e-commerce marketing system



computing resources provided by the IAAS layer, and the products and services of the PAAS layer are also likely to be built on the IAAS layer service.

(3) Application of cloud computing in e-commerce

Cloud computing has a powerful large cluster server, so distributed computing can process big data very quickly. For large sellers, using cloud computing technology, a comprehensive analysis of the data can be used to facilitate the company's marketing. Cloud technology has two main aspects for the application of e-commerce. On the one hand, it utilizes the powerful computing power of cloud computing to process big data, and to clear, filter, and mine data. Another aspect is the use of cloud computing platforms, including the infrastructure layer, platform layer and application layer, for deploying applications and implementing system functions.

The introduction of cloud computing will bring huge changes to the field of e-commerce. First of all, in terms of security, the cloud computing security system has greatly improved the security level of the system, solved the security problem and reduced the investment in this area. The second aspect is that the "outsourcing" of operation and maintenance, that is, the work of purchasing, setting, and operating a large number of basic underlying devices can be greatly reduced, all of which are handed over to the cloud, and can be customized. In the early stage of development, purchase a small amount of customized resources to support the business. If there is new development in the future, you can purchase a larger resource allocation without time cost. The resource adjustment is arbitrary and customized. From the perspective of the whole society, cloud computing also fully optimizes the allocation of resources, and the existing resources are fully utilized, in line with the low-carbon environmental protection concept. The third aspect is that cloud computing can provide platform

support and application services. By distributing the performance of multi-region and multi-server distributed, it can serve one user and concentrate on idle resources, which is the core of cloud computing. The fourth aspect is that cloud computing brings good economic benefits to enterprises, which can not only solve enterprise costs, reduce manpower input, have no infrastructure settings, but also have high-end functions such as data analysis to meet enterprise needs.

2.4 Cloud Computing-Based Big Data Processing Technology

(1) Centralized and distributed acquisition technology

Specifically, big data has two ways of collecting information, one is centralized and the other is distributed. If the user values the ability to control the integrity of the data, then centralized techniques can be employed. And if it is focused on the ability to handle data flexibly, then it can be distributed. The content of information to be collected by big data technology is mainly a series of data generated by the users of the client in the process of interacting with different platforms. And these data information may be relatively independent, or it may be more dispersed. Therefore, if these scattered information can be correlated by means of big data, then it can be effectively utilized. Cloud computing can solve these big data collection problems in a targeted manner, and enable related data to be stored in servers equipped by various organizations.

(2) Storage technology

At present, the data generated by the Internet every day is massive, and it has the characteristics of strong dispersion. Therefore, if the traditional data storage method is used, the current data processing requirements cannot be effectively satisfied in time. Moreover, if a more conventional method of processing data is used, it also takes a long time and is not efficient. In this context, if you can use cloud computing technology, by means of its unique column-based way of storing data, data with different attributes can be reasonably segmented and equipped with relatively independent storage units, then it can make the final processing effect of the data has been greatly improved. In addition, since the way of storing data can greatly compress the space occupied by the past data, it is also possible to save data storage costs that cannot be ignored.

(3) Mining technology

Based on the cloud computing technology, big data processing and mining can be carried out in a more comprehensive way. Based on the online analysis, the mining technology prepared by cloud computing can express it by means of the model by fully excavating many data. At the same time, this technology can also enable a lot of potential data to be fully explored and maximize its value.

3. EXPERIMENTS

3.1 Data Collection

The experimental object of this paper is an e-commerce enterprise that has been involved in the field of e-commerce for many years. The company's business model belongs to the B2C model, which buys goods from regular vendors and sells them on its own website. Compared with C2C mode, its product quality is more secure. In this mode, the company provides consumers with a shopping environment through the Internet, and consumers log on to the mall home page to view product information. The company also has its own built logistics system.

3.2 Development Environment

This platform is developed under the Microsoft Windows 7 system using eclipse development tools. The development language uses Java language, and the J2EE combination framework SSH is used. The front end adopts html page and css style, and is jointly developed with JavaScript language.

3.3 System Design

(1) Overall framework

For the integrated management marketing system of e-commerce companies, it is necessary to have integrated management functions, data information collection functions and marketing analysis functions. At the same time, in the system design, it is necessary to take into account the other functional requirements of the company. The design of the system uses a unified platform to integrate multi-system architecture mode, adopts SSH technology, and the database uses HBase to develop an integrated management marketing system for the company. Business development provides a solid technical platform foundation.

(2) Hierarchical structure

In the architecture design, the bottom layer is HBase database, the persistence layer uses Hibernate technology, the business logic layer uses spring technology, and the presentation layer uses Struct2 technology to finally transmit information to the client browser. In the front page of the page, combined with jQuery, HTML and other technologies, the module design of the page and the implementation of each function are realized.

4. DISCUSSION

(1) Order management

The order management system is the core of the integrated management system. It needs to have order information collection, data editing, packaging setup, logistics setup, waybill number setting, delivery and other functions. The order management system realizes the one-stop management of orders, meets the actual needs of merchants, and through the management and distribution of orders, it has an organic collection with other systems such as inventory management and transportation management. Order management is shown in Figure 3.

(2) Analysis of marketing plan selection

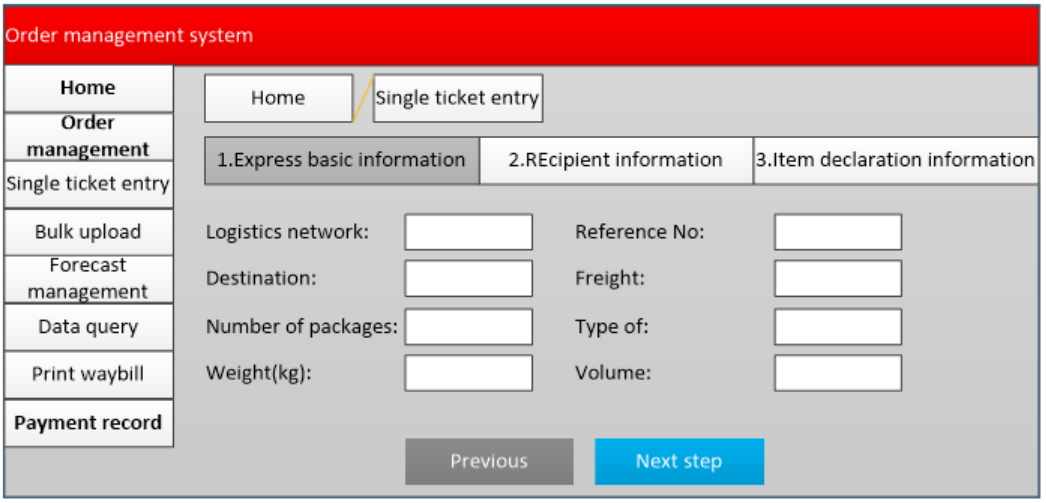
In the overall sales analysis, it is necessary to analyze the customer unit price, the payment amount, and the year-on-year change. The trend of the transaction is shown in Figure 4.

(3) Sales customer selection analysis

For the customer, statistical analysis is carried out, and the customers are grouped into six groups. Sales customer grouping is shown in Table 1.

(4) Analysis of system performance test results

Figure 3. Logistics setup diagram



This article compares the Hbase and Mysql databases and finds that HBase queries are faster. While Mysql supports SQL queries, it has a high latency limit and cannot meet the requirements of big data real-time interactive query. The performance test results are shown in Table 2 and Figure 5.

1, 2, 3, 4, 5, 6, and 7 of the abscissa in Figure 5 represent 4, 20, 40, 200, 400, 2000, 4000 data amounts, respectively. As can be seen from Figure 5 and Table 2, the query time of the Hbase database is much faster than the query time of Mysql.

(5) Use big data to deepen consumer demand analysis

Companies should transform their service methods and seek trends in consumer demand changes from big data. Consumers have already well reflected consumer psychology through currency voting

Figure 4. Preview of the trend

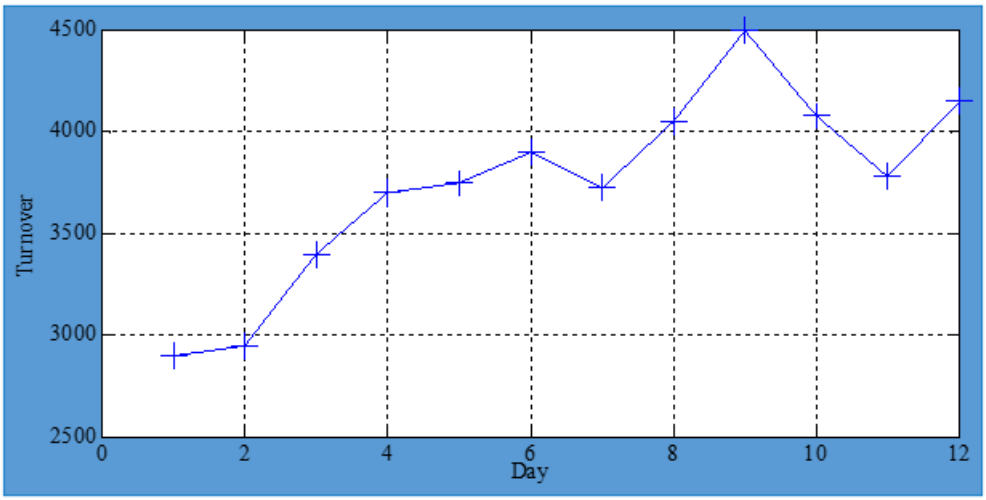


Table 1. Customer grouping

Name	In-group customer management	Operating
Customers with high turnover	Customer management	Modify delete
Customers who join the shopping cart	Customer management	Modify delete
Customers who join the wish list	Customer management	Modify delete
Transaction customer	Customer management	Modify delete
Join a lot of customers in the shopping cart	Customer management	Modify delete
Join a lot of customers on the wish list	Customer management	Modify delete

Table 2. Performance test results

Amount of data (ten thousand)	Hbase time(s)	Mysql time(s)
4	0.067	4.034
20	0.058	10.215
40	0.154	15.560
200	1.081	20.245
400	3.096	26.524
2000	6.154	35.678
4000	10.486	50.184

Figure 5. Time performance test results

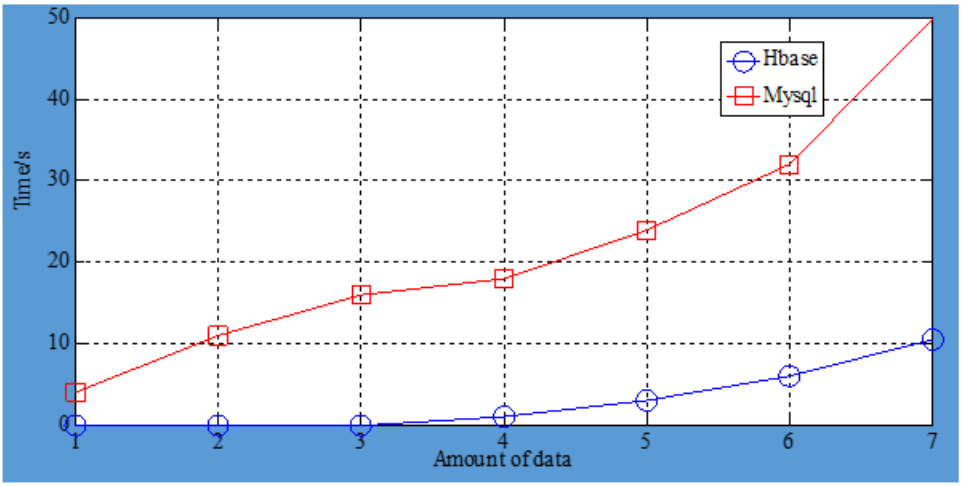
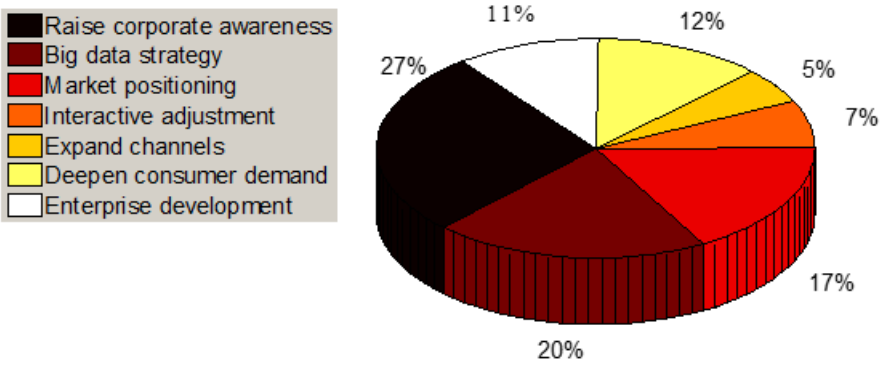


Figure 6. Proportion of precision marketing strategies based on big data analysis methods



and keyword searches during the purchase process. For example, when the Amazon page jumps to the page that alvo cleans up, the probability of consumers searching for "gift" and "for sister" is very high, indicating that consumers buy jewelry mainly for giving away to relatives and friends, and companies can develop this characteristic attribute. Figure 6 shows the proportion of each precision marketing strategy based on big data analysis methods.

The application of big data and precision marketing is more unstructured and exploratory. Therefore, data mining and unstructured analysis of data are more important. This requires marketers to master and mine the information behind big data. And exploratory analysis (such as market positioning) is more of no existing rules to follow, which is an important reason why there is no common paradigm for exploratory analysis of big data. Big data provides user portrait system for precision marketing and provides better analysis tools for further analysis of consumer needs. The user portrait system can allow companies to achieve deeper consumer needs based on previous precision marketing, and the big data analysis system provides a linkage tool for the analysis of consumer needs. For example, the company's previous analysis of consumer needs can only provide companies with information about consumer locations and consumption quantities, but big data analysis systems can realize the linkage of consumers' personal information, consumption habits and consumption preferences through complex algorithms. Analysis provides new tools for companies to analyze consumer needs, and they can also compare the results of data before and after to understand the changes in consumer needs, so as to adjust their precision marketing strategies more timely and effectively. The influence of personal information, consumption habits, and consumption preferences on e-commerce marketing in the big data environment are shown in Figures 7, 8 and 9, respectively.

Figure 7. The degree of influence of personal information on e-commerce marketing

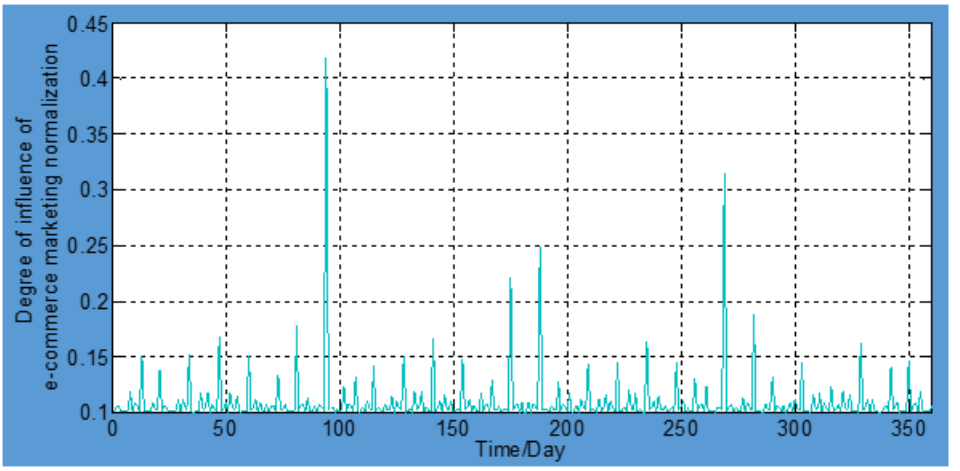


Figure 8. The degree of influence of consumption habits on e-commerce marketing

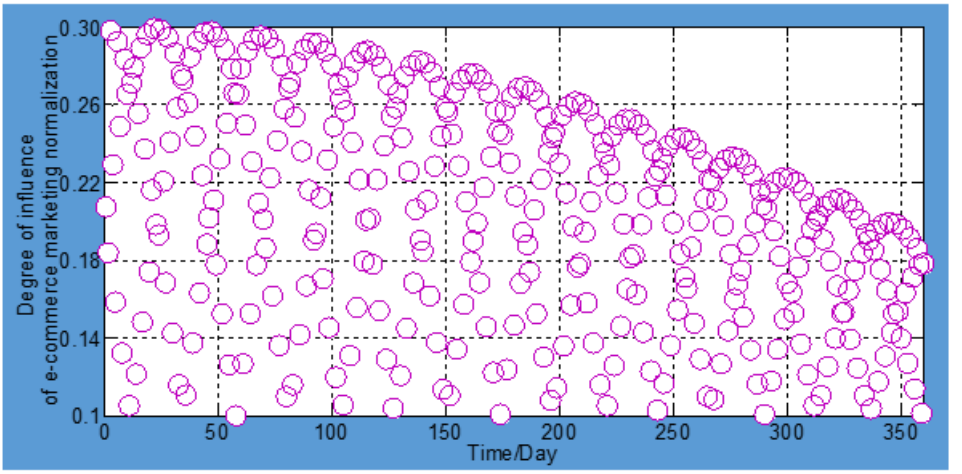
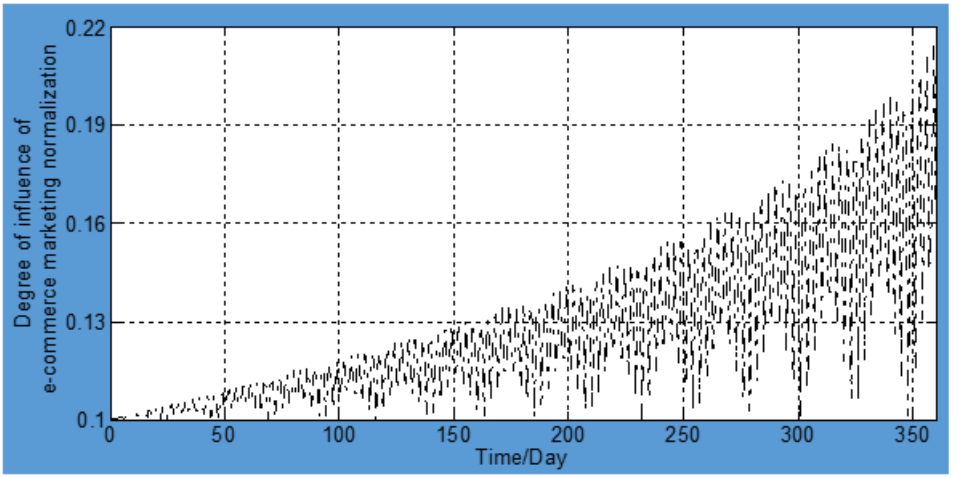


Figure 9. The influence of consumer preferences on e-commerce marketing



5. CONCLUSIONS

(1) This paper developed an integrated management marketing platform and implemented the application. Through the Web technology and SSH framework, the development and implementation of the integrated management marketing platform. The system studied in this paper greatly simplifies the company's business work and reduces the labor cost and time cost of the company. At the same time, the inventory information was updated and replenished in a timely manner, realizing the renewal of the company's inventory and alleviating the pressure of replenishment.

(2) The system applies big data to the integrated management marketing platform, and manages the classification by customers. Assisted in the maintenance of the company's customer relationship, which is conducive to the generalization but prone to product promotion.

(3) The marketing analysis function of the system is combined with e-commerce enterprises to display data by big data, helping salesmen, especially business managers, to develop more targeted sales strategies and promotion management, which enhances the company's sales and profit margin. At the same time, the use of data charts as a supporting display can enable e-commerce companies to more firmly implement and implement marketing plans.

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