E-Commerce Consumer Behavior Information Big Data Mining

Liu Hongyan and Liu Zhenyu

Beijing Information Technology College, National Center For the Perform Arts
Email: 1241420132@qq.com, 112858658@qq.com

Abstract

With the Internet applications in the commercial area of rapid spread, consumer demand-driven experience of becoming a leading Internet development. At the same time, e-commerce as the representative of the social network of constantly new changes. In computer systems and social integration of e-commerce systems are highly interactive, the consumer bears an increasingly important role in consumer behavior characteristics and potential demand has become an important driving force for technological development. A large number of enterprises through the establishment of collaborative filtering recommendation systems predict consumer model, personalized recommendations and services to address the information overload problem. Based on the above requirements, in-depth study of the progress of theoretical research services and service quality management theory, according to a large data analysis and complex network, is recommended by consumer behavior.

Keywords: Consumer behavior, e-commerce, big data, complex network

1. Introduction

According to the China Internet Network Information Center in January 2014 published the "33rd Statistical Report on Internet Development in China", in December 2013 the number of Chinese Internet users was 618 million, compared with the total population of Internet penetration It reached 45.8% in 2013, almost all businesses and consumers to have a sense of the line from the line. "Report" shows that the application of e-commerce in 2013 China rapidly increased. The number of users of online shopping year-round use of 302 million, accounting for 48.9% of the total number of Internet users. China's total e-commerce transactions is developing rapidly, reaching 10 trillion in 2013, and maintained a trend of further growth. The number of transactions compared with the network, the practical application of e-commerce business there is a certain distance. Chinese enterprises in 2013 the proportion of office using the Internet has reached 83.2%, but the annual network procurement ratio 23.5% 26.8% the proportion of online sales network marketing ratio was 20.9%, there is considerable room for development. But also between different enterprise sizes and in different industries, the penetration rate of e-commerce applications there is a big gap between large enterprises due to the strength of having a resource, the popularity of e-commerce applications generally able, SMEs and micro-enterprises use e-commerce as well as room for growth, manufacturing and retail e-commerce applications are usually relatively common, other industries also need construction. In network marketing attention, users under the influence of factors such as changes in consumer attitudes, the theme of development of the Internet has been converted from "penetration upgrade" to "use a deeper level," the transition from offline to online consumer behavior, a lot of tradition companies have begun to combine online and offline sales model, the network of sales channels to find new business growth, production and sales processes, products and services, network channels and traditional shops in the new network economy background fusion has occurred.

As the network system of powerful information processing capabilities, global Internet

market has greatly affected the traditional business activities, the development of enterprises has brought new challenges and opportunities. Consumer behavior studies need further according to China Electronic Commerce Research Center released data indicate that in 2013 China's annual e-commerce transaction volume has exceeded 10 trillion yuan, but still continue rapid growth trend. With the development of information technology, consumer behavior with respect to the traditional business environment, constantly showing new features. Therefore, consumer behavior research network, is facing many new challenges: First, how complex information needs to collect and interpret correctly businesses need; the second is how to develop a reasonable consumer research methods and systems to adapt to consumers online rapidly changing intentions and behavior trends. Therefore, relying on information technology network, through the network platform for consumers' personal data and consumer habits to collect data, and then use the data collected for statistical and analytical techniques, excavated from the online consumer information in consumer behavior preferences, emotional tendencies, habits and other characteristics of information, as well as common complex network groups present in consumer behavior and interaction, it is possible to accurately grasp the needs of customers, build personalized customer service system, the management of network resources and guidance network security control, with a strong practical significance and economic benefits. E-commerce recommendation system is relatively one-sided study of personalized recommendation system can help customers choose their favorite products can now be used in many real networks, like Amazon, Dangdang, Taobao and other sales sites, Google and other search sites, *etc.*, successful provide the recommended system services, to promote the sale or recommendation information purposes. Since the end of last century, the academic research community as well as practical aspects of business, have done a lot of research on recommender systems technology in the improved algorithm provides a lot of literature results. With the expansion of the scale of the Internet, the number of e-commerce consumer information and product information on the huge project, the traditional recommendation algorithm and recommended quality cannot provide satisfactory results. Currently recommended systems are mostly carried out based on consumer ratings history information such as recommended, since the mass of information in historical ratings data for a particular project often extremely sparse and other issues, the recommended low accuracy and computationally intensive. The first is when a small amount of information a user score could not be calculated its similarity, but with little user ratings data on common projects, it is difficult to calculate the similarity between users; and secondly for the user to enter new projects, due to lack of historical rating data, recommended the project could not be recommended based on calculated similarity, and therefore confined to the improved algorithm recommended models tend to not really meet the needs of users. According to the theory of six degrees of separation small world, in context of the internet, it will have some common group after polymerization, can build a trusted network, are based on research from different angles in the computer technology field of management and economics of trust recommended application theory of consumer behavior psychology personalized recommendations to solve the problems, the study trust management, service quality and consumer perception system and its relationship with the consumer decision-making behavior, and to tap their preferences and consumer behavior based on the mutual information feature Contact between the target user provides personalized recommendation services to enhance consumer perception of service quality and satisfaction with the use of e-business information systems, to improve the competitiveness of enterprises have a strong practical significance.

The ultimate purpose of online consumer behavior research to take full advantage of computer technology to better serve humanity social services, social psychology, computer science, networks, economics, marketing and other disciplines of integration and interconnection. User guide the direction of the Internet has become a field of

research and management science. In the new era of Internet technology popularization, consumers tend to come out on the internet behaviors and needs more attention, but also can have a greater impact. Internet itself is a huge complex giant intelligent system consists of complex human societies and work together to build a computer network system, regular online interaction relationship between consumer groups, members constituting the statistical characteristics, personality characteristics and behavior It can be converted into the form of information and data. Through information technology to manage, analyze and mine, to guide the implementation of computer network system planning and corporate strategy to guide network resource information systems and human social systems harmonious integration.

Information service is for the needs of users of information extracted from the process, it is to search for information and knowledge, organization, analysis, integration of information and capacity as a platform, based on the user's problem and the environment, the process of integration into the user solve the problem from a variety of explicit and implicit information resources, to provide users with developed and consolidated information products. With the development of Chinese economy, the growing information needs of the user, information service as a special information goods, are all areas of social life in show its importance. Accompanied by the development of science and technology and the social economy, especially the development of the Internet and information technology, people and information environment is changing information behavior, information service model also will be a corresponding evolution. Information service model from different perspectives have different classifications, but no matter what kind of classification, information resource center to the user needs as the center of change has become an inevitable trend in the development of information services, for which different scholars have done different exposition. Chen Jianlong information service based on the relationship between the four elements, the basic pattern area information service from the information services into information systems, documentation and information service and other product-centric delivery model, information from the user's information needs and the use of user information-centric usage patterns and information from the user's current problems to be solved and user-centered problem solving problem-solving mode. With the rapid development of the amount of information is growing exponentially and user needs and specialized vertical-oriented, on the one hand is a huge chaotic mass of information, on the other hand the user cannot find an effective transfer of information to meet the demand, which not only caused info enormous waste of resources, but also for users to query the desired information caused great difficulties. The introduction of the concept of personalized information service is to provide users with a fast and effective way to guide people to the correct orientation in the ocean of information, make full use of the Internet a valuable resource, is an information technology services and new ideas and services mode.

Personalized service concept has existed since ancient, ancient "individualized" Thought is a manifestation of personalized service. Personalized service is the provision of different services and content strategy services for different user modes. With industrialization, in order to improve production efficiency, the idea of personalized service ever give way more efficient mass production and standardization. However, although the large-scale production to meet the people's growing material needs, but is reducing the quality of service for the price. With the development of science and technology, the growing wealth of material goods, people no longer have to worry about plaque lack of material, quality of product and service requirements continue to increase, so personalized products, personalized service become the dominant modern era service trend. Digital information technology is highly developed today, it has become the largest source of information resources. The main problem facing the user is no longer a lack of information plaque, but information overload. In the huge, chaotic information space, information for each user really interested but just drop in the ocean, looking at the vast

amounts of information to the target information in line with the needs of users like needle in a haystack, it takes a lot of manpower and resources. Obviously, the traditional "People look for information" approach has become increasingly difficult to adapt to the rapid growth of information resources, urgent need for a user based on user characteristics and adjust service mode to automatically organize information, so it personalized information services came into being, the goal is to meet the specific information and services specific user at a specific time require [1-3].

2. Related Research

2.1. Theoretical Study of Consumer Behavior

Personalized information services reflects the "customer first" service philosophy, customer demand for the center, is a kind of personalized service, but also an information service. Personalized information service model and the traditional model of the biggest difference is that it needs vary for each user or each type of "tailored" to the individual is different from the traditional way of information dissemination service. Personalized Information Service in order to grasp each user's personal interests and preferences, must interact with the user, from which to obtain the user's behavior record, and analyze and process, so as to equip each user's personality, the only way for users to be able to ` the special needs "right" to provide personalized service.

Specifically, with respect to the traditional mode of information service, the main advantage of personalized information and services that targeted personalized information services through research user behavior, interests, hobbies and habits to automatically organize information to adjust the content and service model, provided is based on user-specific information tailored to the needs, can be targeted to meet the needs of users, so that users do not have to face a lot of information is not a loss of interest and initiative of personalized information services to proactively perceive personalized information needs of different users, timely initiative to push information to the user, change from passive to active service, users can save a lot of time and effort to gather information about the flexibility of personalized information services to be services in accordance with user-specified ways, such as to meet the user information is displayed, requested service and the way the results of the time, place of service, provides users with the flexibility of time and space, so that users can receive services when and where they wish, to facilitate access to and use of information resources. Intelligent Personalized Information Services uses the feedback reasoning, machine learning, artificial intelligence and intelligent agent technology, by tracking the user's interests and learning preferences and usage patterns, to create a user model and information model, continually tap the potential user interest feature, intelligent recommendation and intelligent filtering information, thereby significantly improving the quality of information services.

In 2000, the Institute and other human search engine increased personalized recommendation feature, to achieve personalized with date, US-based multi-national research institutions and networks personalization company set up a personalized association that promotes personalized service development, and proposed to protect personalized services involved in user privacy. In personalized study began to be widely used in commercial fields. New York University and achieve a personalized e-commerce website user modeling system has added personalization features in its e-commerce platform to facilitate business development of personalized e-commerce site Institute, who proposed Personalized Meta Search Engine Prototype System. In recent years, personalized information services gradually from academic research to practical application. Many companies have been offering a personalized system to provide personalized service. Many websites have launched a personalized e-commerce site features a lot of great opportunities also noticed personalized service, also launched a

personalized service functions. Some of the information agencies of personalized information services do a lot of useful exploration, such as an external system Cornell University Library, users can customize their own personalized list of network information resources, library resources update notification, Journals, Journal Full services, bibliographies, and other digital resources. With the further expansion of the development of information technology and the market size, business model, management and operation of social systems integration and information technology are growing together, online consumer behavior also will continue to study the decision and continued to increase in depth [4-5].

2.2. Consumption Recommended System

The concept of collaborative filtering formally proposed by the Xerox Palo Alto Research Center, Goldberg and other scholars, the research team designed a through Tapestry system that allows users to use the system to add annotations based on their degree of interest, then the team used these labels to Information filtered according to user preferences to predict the extent of the calculated results of the sort, it is recommended to the target users. In 1994, the team used computer science department University of Minnesota in the United States collaborative filtering principle established Movielens movie recommendation system, a study of the system established by the data set currently is collaborative filtering one recommendation algorithm of the primary data set sources, promoting the recommendation development of systems research.

Early collaborative filtering recommendation algorithm is based on the similarity of the user's computing k-nearest neighbor, and then generates a list of Top-N recommendation by predicting the score to the target users. Because as the Internet penetration deepens, the number of consumers and the number of product items has reached millions of users rating the historical data of the project have high sparsity computationally intensive, online recommendation system and prone to error, reduce the recommended quality. Sarwar proposed project based on the similarity of collaborative filtering algorithm can improve the speed of calculation recommended to some extent, and can be calculated in advance based on historical information, but for new projects and new users join the problem difficult to solve. Recommended research model can also change the recommended system configuration item attribute characteristics according to consumer preferences to influence consumer behavior. Mc Knight and Chervany propose personalized recommendation system dependability is a major factor of customer trust in the system can affect. Golbeck pointed out the user's personality plays an important role in consumer decision-making, so personalized recommendation system cannot rely only be calculated based on historical data user rating information and should establish a trusted relationship based recommender system based on user personality. University of Minnesota in the United States also made a recommendation system Konstan research should shift the direction of the user experience from the theoretical algorithm [6-8].

Existing users recommendation algorithm still faces difficult similarity measure real-time performance and poor scalability problems. Numerous studies in the field of computer users and projects still focus on computing similarity of complex algorithms improve, the relative lack of factors that can truly reflect the changes in the process variables of online shoppers complex psychological behavior, causing the system to the recommended resource is largely deviated from the user actual demand, the need for further comprehensive study of how to help consumers simplify the decision-making process, reduce shopping process uncertainty while allowing consumers Recommendations have higher satisfaction.

The development of mobile information technology for businesses and consumers with a new way of service, but also the formation of a large number of new businesses, such as Amazon's sales network, Tencent micro-shops and taxi service software services. After the increasing popularity of mobile Internet technology, intelligent mobile phones to

further deepen the relationship between the network information systems and human social systems, mobile payments and mobile attendance has begun to be applied. Relying on mobile technology and network technology, a large number of enterprises under the online business line and service integration mode of transaction. Consumers can even be traced back along the service value chain to the design, production and sales promotion of the product, while a large number of empirical studies have shown that the process of production and services customer perception of service value of participation has a great role in promoting. In modern ubiquitous network technology platform, supported by enough consumers anytime, anywhere easily participate in a tablet, smart phones and other mobile devices to service process can be increased curiosity and sense of control, consumer participation in the process can reduce the service asymmetric information, and instant access to information about new products, in favor of acceptance of new products, but also tend to encourage further enhance consumer acceptance and satisfaction of the enterprise information systems and enterprise itself. On the other hand, in the mobile Internet technical support, research and analysis of mining and interactive services through the process of consumer opinion and express business to consumer behavior historical information hidden potential characteristics, access to consumer perception of value proposition perspective, to find the direction of improving customer perceived value, reasonably improve products and improve services in line with consumer oriented planning and resource management architecture.

Quality of Service is a measure of how the quality of service providers and service recipients in the service delivery process through the service interaction generated mainly based on the merits of the service recipient of the service, and the service recipients perceived service quality level by the complex and diverse factors affecting the decision. In the process of service-aware consumer, since service is intangible and cannot be stored, mainly service process quality and product quality of the results that can be perceived by the consumer. Multiple service management theory point of view, one of the most important qualities in which the level of 10 major consumer service quality characteristics determine the quality of service is the "perceived" as opposed to all the physical evidence constituting services and services perceptibility in the service process all external physical evidence, will affect the perceived quality of customer service.

In the era of big data quickly develop e-commerce industry, online shopping user demand for commodities also gradually increase the user's purchasing behavior are subtle changing. Less time in the era of big data speed users spend searching for product information faster. Electricity supplier and product information platform integration speed is also greatly improved, compare various aspects of commodity users can achieve in a very short time. And by other users to share product information and product reviews before buying property can understand the full range of commodities including commodities price trends. Online shopping user's primary operating procedures is the landing, search for the desired product, the same comparison, goods consultation, the items in their shopping cart, submit orders, the seller shipping, receiving and evaluation. In this process, the behavior of each user will have the appropriate information. Personalized recommendation service ultimate goal is to enable users to produce goods shopping behavior. The main content of this paper is to study the ordinary course of e-commerce retail website based in affect users of online shopping behavior of various factors, and how these factors effect. Personal factors that affect the user to purchase personalized recommendations of products mainly include users of income levels and online shopping experience.

3. The Proposed Scheme

Based on big data technology is the most important recommendation Web data mining technology. Data mining extracts information about potential cannot easily be found in the hair from the mass of data, and based on the obtained information to predict future trends,

data mining technology can improve the electricity market's decision-making ability. Web Data Mining There are three main types: Web content mining, Web structure mining and Web usage mining. Web content mining excavation is divided into two parts of the text information mining and multimedia information. Web content mining main information characteristics, classification and clustering. Web content network are both from search and database resources to expand research, first in the search elements resources, through retrieval software for the media, information web automatically be combined and analyzed based on the information each user's preferences, will meet user preferences the new information to be collected and shield the user is not interested in the information, which will greatly enhance the level of retrieval, followed from the perspective of a database, Web unstructured data through acquisition and consolidation, user data is automatically filled in, constitute structure database, and then to analyze the data by means of data filtering and data analysis techniques. Web structure mining is the link between the internal structure and the pages to dig out useful information. Web pages can be carried out by classification and clustering mining structure, and can know in advance the user when browsing the web leaving the information through the information to improve various properties of the site, thus improving the site's search function, improve the efficiency of information collection . Web mining process usually refers to a user browsing the Web logs generated summarize and analyze the user's hidden information and visits. Depending on the tracking method can be divided into personalization and access tracking mode. Web browser stores a record of users to access content and mode of these data to dig deeper and find where the law can better identify user preferences and provide personalized recommendations. Establish an effective model to ensure users personalized information recommendation can have a higher quality of service. In order to establish accurate user interest model, needs to be extracted from the corresponding feature information about a user, the application of modeling techniques to record and manage user preferences merchandise. E-commerce personalized recommender service is a network environment, the user interest model established is not a single descriptive model, but with a certain data structure based model.

User model updated in real time based on user needs to find a product in order to ensure the provision of accurate information and good service. Update user interest model can be divided into two types, one is directly updated feedback to update the model recommended by the users of the platform given commodity, easily updated directly affect the normal activities of users of online shopping, users need to spend extra time, so not easy; the other is the indirect updated by tracking the user's browsing behavior and digging Web logs and other ways. RSS can be shared online and can quickly and timely access to effective a technology information. Network platform typically used RSS reader in two categories: the first is on your computer desktop applications to automatically update subscription information; second category online RSS, users can browse information like commodities, do not install this program. RSS RSS technology advantages to the user can send the latest product information; the information is classified according to the primary and secondary, will be the hottest latest release information top, to cover all goods and information needs of users of the site; and the traditional way of subscriptions and favorites compared, RSS technology does not produce information overload; not only can help you receive more information in the purchase of goods, but also spend less time. This theme can be directly polymerized way to pass information to the user. RSS works electricity provider website to provide users with RSS service, the need for RSS Builder form a uniform format RSS document according to the requirements, when the client through an RSS reader to access the link, this will be the background of the server information is converted into an XML document sent to the user. Information service model of the relationships between the main information services, information services receptor, information services and information services means the four basic elements and their descriptions.

For e-commerce service model, it is the main shopping site information services, information services receptor site, information service means the user is the way sites like push information, the information service content is the type of information provided by the user like website. So e-commerce information service model refers to the e-commerce service model consisting of four elements and their relationship is described, namely the massive shopping site mining and processing of data, the potential for users to find the information through a web recommendation Recommend *etc.* delivered to the user, to provide users with personalized information recommendation mode services.

Data is the basis for enterprises to provide services in the face of changing size of the data, storage and organization and other characteristics of the service model offered by commercial enterprises also synchronize changes. It evolved from the traditional passive service into active service combined passive mode. Passive to active service when a customer shopping sites to find merchandise they need, from a user perspective, more targeted, but for the electricity business enterprises, largely ignored the needs of potential users exist. Increase in active service mode, which can be found by potential information needs of the user's data with a specific user with similar needs. Not only to facilitate users to browse to buy goods, giving users an unexpected surprise demand, but also to increase sales of goods Site. Recommended by the traditional personalized information retrieval service results into a personalized recommendation service. Personalized information to each search result is a list of information for the user to browse the page by checking its own comparative commodity details choose the right product. The personalized recommendation service, the user is a conventional filter information analysis, recommended product to meet their needs through scientific computing users, the user can find any of their valuable commodity in shorter time.

3.1 E-Commerce Personalized Recommender Service Mode

Personalized recommendation service's goal is to provide users with valuable product information, thereby facilitating users to buy goods. In line with user and broaden horizons is personalized recommendation of the most essential goals, personalized recommendation core purpose is to bring those who are not customers find product recommendations to customers, so as to achieve the customer after seeing Testimonials cause desire to buy, and ultimately to increase sales amount purpose. Users interested in complex, improve the recommendation system integrity of goods covered, this commodity will recommend the nominee fancy, the nominee to bring a more intimate user experience, to achieve personalized recommendation purposes. Referrals are willing to make the product information feedback, so first-hand information will be retained, so take advantage of the next recommendation process, the nominee of the wealth of personal information, to achieve a virtuous cycle of more and more accurate.

Active users like online shopping cart website to submit the information needs of the site to provide relevant information to users on a regular basis the way to personalized information recommendation service. Focused Recommended main applications of data mining technology and RSS technology, content mining and structure mining through to find the information useful to the user, and recommended to the user via RSS. Such information recommendation service is mostly used book sites, since these users are generally fixed users, they will be able to accurately convey their demands to the information provider, while electronic business platform can be more accurate understanding of the information needs of users. User information has a fixed shopping needs, electronic business platform can be updated in real time on a regular basis in accordance with product information, product information sorted out in line with user needs. Other retail B2C and C2C website the user can also be given the title information push, when a new user registration through a questionnaire, to grasp the general direction of each user attribute product type, brand, price and so on, according to the user's wishes and demand through the station private letter, and send e-mail notifications, SMS, *etc.*

recommended product information to the user.

Recommended hot shopping site refers to the current best-selling merchandise shelves, or the latest initiative pushed to the user a service, such recommendation is an active recommendation mode, electronic business platform based on real-time updates of users browsing data integration was the hottest commodity information and push it to the user. Push the hot spot information through data mining and collaborative filtering techniques to find the most popular real-time product information, through the Internet users commonly used in other sites pop-up window or suspension websites pushed to users. Power's Web site user information in the Internet browser and click on the left when information, tentative push information to the user. Recommended hot information usually requires the user to browse multiple clicks to form. Hotspots recommended information model can meet the interest and the first n-selling products, it is worthwhile being a personalized product recommendation, but also to ensure that sales do. As is often the case of new products are difficult to find users by way of recommendation recommended hot new product also has great significance.
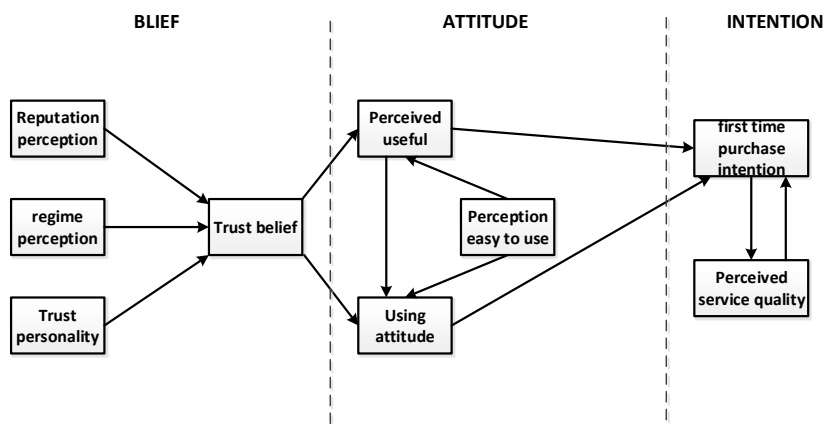

Figure 1. Forecasting Model

3.2. E-Commerce Consumer Behavior of Large Data Algorithm

According to this model, we can predict the personal business information intention, but for this hypothesis testing, BP algorithm for MapReduce, the BP algorithm split into two parts：In the first Map process, the model of batch training is used to function on the network, and the network weights are performed after a certain number of iterations. The second part Reduce combines the output of the Map to obtain a new network weights, and determine whether the adjustment of the iteration according to the weight of the network. The following is a concrete implementation approach and pseudo code. In the Map function, the network read the network weights from the file system, initialization network, read the sample. After a certain number of training has been achieved in the node (The condition may be a certain number of iterations, the output error may be up to a certain level, the weight change amount reaches a certain level. In this study, we use the output error reaches a value (0.01)) the partial sample can be considered as the convergence state of the node. Map of the output is a team of value pairs. After Reduce obtains the value pairs, process it. Define an implementation Writable interface class Weight Writable as a value type of the Map.WeightWritable implements the Writable Hadoop interface, which conforms to the standard of Hadoop serialization, and records the weights of the network after training. Each turn of the learning result is sent to a Reduce to be integrated, so the output of the type Long Writable key is set to a uniform value (0).

The process of the Map function is as follows:

1. Read the HDFS's weights records on the preservation of the network.

2. According to the network weights read, instantiate a neural network.

3. Process Text and extract the input of the training sample and the target output. Then, Normalized.

4. Use a sample to train, until the end of a training condition is met.

5. Get the weights in the network and instantiate WeightWriteble.

6. Output WeightWritable

Function Reduce receive the output of Mapcalled <1|01^Writable, WeightWritab10 as its own input and the output is <LongWritable, IntWritab10. Where value is the type of int and means whether the network needs to be carried out in the next iteration. The value of 1 is required to reiteration and the end of training for the 0. Reduce counts the total weight of each map and calculated the average value as the weight of the whole network. After calculating the weight of the arithmetic average(The arithmetic mean value is the addition of each weight matrix, and then the division operation. WeightWritable realizes the accumulation function and division function.), function reduce can read the network weights in file system saved before training and compare two weight records. When the difference between them is less than a certain level, the output of the int sets 0, otherwise sets 1. Using the weights WeightWritable of the value after training update the weight file in file system and the initial weights are used as the initial weights of the next iteration.

4. Experimental Results and Analysis.

This experimental environment uses 4 ordinary personal computer and the configuration is as follows:

NameNode: one computer; CPU is 2.3 GHz; Memory is 2G; Hard disk is 300G;

DataNode: 3computers; CPU is 2.67 GHz; Memory is 1G; Hard disk is 80G;

Software environment–Ubuntu10.10; JDK 1.6; Hadoop 0.20.1; HBase 0.90.3.

There are three purposes in this experiment: 1.verify the feasibility of the neural network algorithm based on cloud platform; 2.Test the convergence rate of the algorithm; 3. Test the training accuracy of the algorithm。

The data set used in this experiment is derived from the Data Set of UCI named Breast CancerWisconsin(Original).The data set is a collection of typical models for pattern classification, which can be used to test the classification results of classification algorithms. The data set contains 699 sample data. 16 of them are missing. The first 450 data are used as training samples. The remaining 233 are used as test data. Each record contains 11 domains, where the data field 1 is the 1strecord of the ID. The data field 2-10 is the data input mode and the data field 11 is the record of the classification. Each record is divided into two types, positive one and negative one. In the experiment, the training sample is divided into several parts to carry on the training to the multiple Mapper. The network classification accuracy test is carried out in the experimental drive function. After each experiment run for10 times, then calculate the average value.

Table 1. The Time Required to Predict

| File（M）	7.12	17.8	28.5
Time 1	2612	6645	10563
Time 2	2702	6650	10569
Time 3	2628	6570	10650
Time 4	2630	6518	10578
Supervised learning training number v.s. average error			
The number of training	Average Error		
8	125%		
25	110%		
520	52.6%		
1200	5.6%		

5. Conclusion

In this paper, based on E-commerce web information recording study consumer behavior and consumption patterns based on a variety of proposed behavior analysis and behavior prediction method, according to the modified neural network algorithm for large data mining, according to this mining results, use cloud computing methods of forecasting model, and ultimately through the experimental data can be seen that the proposed algorithm has the advantage of convergence time, and the prediction error is smaller.

References

[1] K. Y. Goh, C. S. Heng and Z. Lin, "Social media brand community and consumer behavior: Quantifying the relative impact of user-and marketer-generated content", Information Systems Research, vol. 24, no. 1, **(2013)**, pp. 88-107.

[2] B. A. Sparks, H. E. Perkins and R. Buckley, "Online travel reviews as persuasive communication: The effects of content type, source, and certification logos on consumer behavior", Tourism Management, vol. 39, **(2013)**, pp. 1-9.

[3] J. D. Lindquist, P. M. Lane and C. J. Kaufman, "Polychronic Behavior: Conceptually Where are we and What are the Marketing and Consumer Behavior Implications", Proceedings of the 1991 Academy of Marketing Science (AMS) Annual Conference. Springer International Publishing, **(2015)**, pp. 27-31.

[4] I. Vida, J. Damjan and A. Fairhurst, "Ethnocentric tendencies and consumer purchase behavior in Central and Eastern Europe: the case of Slovenia", Proceedings of the 1996 Multicultural Marketing Conference. Springer International Publishing, **(2015)**, pp. 49-54.

[5] G. P. Lantos, "Consumer behavior in action: Real-life applications for marketing managers", Routledge, **(2015)**.

[6] V. Marx, "Biology: The big challenges of big data", Nature, vol. 498, no. 7453, **(2013)**, pp. 255-260.

[7] S. Shekhar, V. Gunturi and M. R. Evans, "Spatial big-data challenges intersecting mobility and cloud computing", Proceedings of the Eleventh ACM International Workshop on Data Engineering for Wireless and Mobile Access. ACM, **(2012)**, pp. 1-6.

[8] H. Chen, R. H. L. Chiang and V. C. Storey, "Business Intelligence and Analytics: From Big Data to Big Impact", MIS quarterly, vol. 36, no. 4, **(2012)**, pp. 1165-1188.

Authors
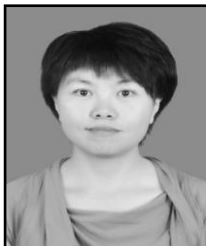
Liu Hongyan, received then B. Eng. degree in Computer Application from Inner Mongolia University and the M. Eng. in Computer Technology in Beijing University of Technology, China, in1997 and 2011 respectively. Her current research interests on Electronic Commerce Website Development and Mobile Development.

Liu Zhenyu, received then B. Eng. degree in Computer Application from Inner Mongolia University and the M. Eng. in Computer Technology in Beijing University of Technology, China, in1997 and 2011 respectively. His current research interests on Website Development and Network Security.