Research on the Recent Development of Information Management Technology in the Field of E-commerce

Yuxiao Zhang
Beijing University of Posts and Telecommunications, international college, Beijing, China
zhangyuxiao@bupt.edu.cn

Abstract. As e-commerce has become the new engine of my country’s economic development, information management technology has increasingly become the focus of various e-commerce platforms. Today’s information management technologies are divided into two categories: enterprise-oriented and user-oriented information management technologies based on their use objects. Specifically, it includes personalized information service technology, user query intention recognition technology, and e-commerce information cross-platform retrieval technology. This article elaborates on the basic principles or framework of the above-mentioned technology, analyzes the development and application of information management technology in the field of e-commerce, in order to promote the development of e-commerce and information management technology to promote each other and make progress together.

Keywords: e-commerce, information management technology, development status, application, principle.

1. Introduction
With the development of computer and information technology, more and more people tend to use e-commerce platforms for shopping. Therefore, a large number of e-commerce platforms have emerged, and traditional shopping methods have gradually become online. The development of information technology to a certain scale will derive e-commerce. At the same time, the continuous development of information technology will also promote the continuous progress of e-commerce, and the demand for information technology in the field of e-commerce promotes the continuous innovation of information technology. Therefore, the development of the two promotes each other and is inseparable. Nowadays, a large number of platforms use technologies such as cross-platform retrieval of e-commerce information and personalized e-commerce information services to gain competitive advantages. Therefore, research on information management technology in the field of e-commerce is very necessary.
2. Application of enterprise-based information management technology in e-commerce

2.1. E-commerce personalized information service technology
The essence of personalized information service is "information looking for people", and the core is personalized information recommendation service. Therefore, personalized information recommendation service is the standard, and the main technologies applied are: user modeling technology, RSS technology, etc.

2.1.1. User modeling technology
User modeling is to express the user's interest and preference information utilization model and is the core of the system to provide personalized information services. All personalized information services are based on user interest models.

User modeling is a complex process that can be roughly divided into three aspects: one is the recording and expression of user information behavior; the second is to determine the user's attention to the information accessed based on the results of user information behavior analysis; and the third is Use the user's attention to information to mine and quantitatively evaluate their interests and preferences, thereby establishing a user model.

2.2. RSS technology
RSS is a new type of Internet technology that allows information to be aggregated and disseminated. In the early days of its birth, it was used to aggregate and push dynamic information such as news and blogs. Later, the scope of application was continuously broken and became an indispensable technology in e-commerce.

The realization of RSS technology requires modules such as RSS reader, RSS summary library, and RSS generator. Its working principle is that users use RSS to subscribe to information. The e-commerce platform uses RSS generators to aggregate various information into the RSS summary database. The information subscribed by users is extracted from the RSS summary database and assigned a URL link site for users. Use. The technical schematic diagram is shown in Figure 1.

![Figure 1. Schematic diagram of RSS technology](image)

2.3. Design framework of space management in e-commerce system
The effective integration of network environment information and e-commerce system is the key to promoting the development of informationization and the improvement of the industry level. On the one hand, this integration can realize effective management of resources, and on the other hand, it can conduct in-depth exploration of user behavior and better for the planning and decision-making services of e-commerce platforms.

The entire information management system is divided into two parts, one is the information system part, with MapInfo as the back-end server, automatic OLE secondary development diagrams are carried out in the Visual Basic 6.0 environment, and the spatial data attributes and graphics are divided. Among them, the attribute information is stored in the Mysql large-scale distributed database. The second is the...
e-commerce part, which uses efficient Apache, Mysql and PHP architecture to realize e-commerce functions. The large database Mysql is the connection point and common part of the two systems. A very good feature of PHP and Mysql is that they can be used in any major operating system and many other operating systems. The architecture block diagram of the entire system is shown in figure 2.

![Figure 2. Block diagram of space management design architecture](image)

3. Application of user-based information management technology in e-commerce

3.1. User query intention recognition technology

In the e-commerce platform, the identification method of user query intention is an important research content. The system conducts research by observing the links that users visit the page. The session refers to the information interaction between the user and the web server. This session starts when the user browses the web page of the e-commerce platform. Each page the user browses must contain a specific product, including the user's behavior characteristics, and the shopping cart. Select features and brand features of commodities and commodities, users collect commodities and add to shopping carts and purchase behaviors.

3.1.1. Analysis of shopping cart selection. In order to obtain the behavior of whether the shopping cart is selected, \( S_{i\bar{q}k} \) is used to represent the shopping cart selection of the k product page by the user i in the q session, and its value can be 1, 2, 3, 4, 5. The expression is shown in formula (1)

\[
S_{i\bar{q}k} = \begin{cases} 
1, & \text{Specific business platform} \\
2, & \text{Remove goods} \\
3, & \text{Item status} \\
4, & \text{Commodities added to goods or note collection goods} \\
5, & \text{Item} 
\end{cases} 
\]  

(1)

Assuming that the user's choice on the next product browsing page \( k + 1 \) is uncertain and is randomly related to the previous product browsing page, the utility \( V_{ij\bar{q}k} \) related to the intention S of the user i to select the product j is shown in expression (2).

\[
V_{ij\bar{q}k} = \begin{cases} 
\beta_{ij\bar{q}0} + \beta_{ij\bar{s}2} x_{i\bar{q}k}^2 + \beta_{ij\bar{s}3} x_{i\bar{q}k}^3 + \beta_{ij\bar{s}4} x_{i\bar{q}k}^4 + \eta_{ij\bar{q}ks}, & \text{for } j = 2, 3, 4, 5 \\
0, & \text{for } j = 1 
\end{cases} 
\]  

(2)

\( \beta_{ij\bar{q}0} \) is the capture and selection of user features, and the current intention state is effective; \( \beta_{ij\bar{s}1} \) is the parameter vector whose feature dimension is \((L+1)\times 1\). The behavior of browsing a specific e-commerce platform is the bottom line of choice \( V_{ij\bar{q}k}=0 \) with a utility of 0. \( x_{i\bar{q}k}^1 \) is the behavior feature...
vector of the user \( i \) when the \( q \) session reaches the \( k \) page. \( x^{2}_{iq(k)} \) is the product feature vector, \( x^{3}_{iq(k)} \) is word-of-mouth stimulation, and \( x^{4}_{iq(k)} \) is brand stimulation. The \( x^{1}_{iq(k)} \) feature vector composition includes user activity and whether the product was purchased in the previous session. In addition, the longer the user browses the web, the more interested the user is in the product and the greater the likelihood of purchase.

3.1.2. Analysis of commodity characteristics. The user's selection of the product in the shopping cart is related to the user's preference for the product \( x^{2}_{iq(k)} \) in the session. The popularity of a specific product (SPRefer) is that when a user considers a product on an e-commerce platform, he may browse the product multiple times in multiple sessions, and the user's operation behavior on the product induces a cumulative effect. Therefore, it is defined that the same commodity operation behavior is weighted and accumulated in different sessions of user \( i \) that are not related to session \( q \), as the popularity of the commodity SPrefer. As shown in expression (3).

\[
S\text{Refer} = W^{T}B_{k}
\]  

Where \( W^{T} \) is a weight vector of 5×1, and \( B_{k} \) is the cumulative feature vector of the five operation behaviors of user \( i \) on the page \( k \) of the session.

Whether the product has ever been purchased Schase is the purchase preference of the product that the user has repeatedly purchased. Analyze the impact of repeated purchases on the selection of shopping cart items. Whether user \( i \) has purchased the product before page \( k \), and the inventory unit is used as the feature of "whether the product has been purchased". The value of Schase can be 0 and 1. When it is 1, it means that the user has purchased the product before page \( k \), and it is 0 that the product has not been purchased.

3.2. Cross-platform retrieval technology for e-commerce information

3.2.1. Theme web crawler technology. In the era of information explosion, general search engines can no longer meet people's needs, and topic crawlers that can obtain more comprehensive information in a specific field have attracted more and more attention. The theme web crawler adds the calculation process of the correlation between web content and the theme on the basis of the general web crawler, that is, before the web page is downloaded, only the page with a high correlation score with the theme is selected for download. The theme crawler flowchart is shown in the figure 3.

![Figure 3. Theme crawler flowchart](image_url)
3.2.2. Search strategy of topic web crawler. The search strategies of topic crawlers are roughly divided into the following two categories: One is the theme search strategy based on web content. The main idea of the topic search strategy based on web content is: grab the text content and anchor text in the page and calculate the similarity with the defined topic, and keep the pages with high similarity. This type of algorithm has obvious effects and high scalability, but it is also very easy to produce "local optimization problems" and "tunnel problems".

The second is a link-based topic search strategy. The main idea of the link-based topic search strategy is to calculate the degree of citation of each webpage based on the link relationship between webpages. This type of algorithm considers that if a webpage is linked to by multiple other webpages, this webpage is more important. Although this type of algorithm effectively reduces the calculation amount of topic relevance calculation and query response time in the process of topic web search, because the topic information is not taken into account in the calculation process, it is very easy to produce "topic drift problems", leading to crawling a large number of web pages that are not related to the subject.

4. Conclusion
In the field of e-commerce, information management technology is still in practice and exploration stage. The development of information management technology can effectively improve the shortcomings of e-commerce platforms in the development, and can also provide users with more convenient and high-quality services. E-commerce has not only brought a positive and far-reaching impact on economic development and innovation, but also brought great challenges. Therefore, it is necessary to promote the continuous progress of the informatization construction process, strengthen the actual effect of informatization management, improve the economic efficiency of production, achieve the goal of economic and efficient development, and promote the sustained and long-term development of my country's economy.

References
[1] Hu Pingrui, Li Shijun. Theme crawler based on URL pattern set [J]. Application Research of Computers, 2018, 35(03): 694-699
[2] Yan Rui, Li Shijun. Document retrieval algorithm based on query intention recognition and topic modeling [J]. Computer Engineering, 2018, 44(3): 189-194.
[3] Liu Yang. Application analysis of e-commerce in agricultural economy [J]. Henan Agriculture, 2017 (16): 54-55.
[4] Xu Wen, Wang Kai. The status quo and countermeasures of information service development in e-commerce environment [J]. Journal of Graduate Students of Central China Normal University, 2008, 15(04): 127-129
[5] Dai Fei. Application of data mining technology in e-commerce [J]. Computer Knowledge and Technology, 2011, 7(21): 5043-5044
[6] Wang Qian. Research on the construction of information service-oriented enterprise electronic commerce system [J]. Silicon Valley, 2013, (01): 224+218.