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Analysis of Recommendation System of Science and Technology Information Resources based on User Requirement

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Abstract: In order to make it easier for users to search for information resources, a recommendation system for scientific and technological information resources is proposed based on the analysis of user needs. Through collecting the characteristics of information resources required by users, extracting the common parameters of the characteristics, and classifying according to different parameter ranges, in order to ensure the accuracy of the classification of resource characteristics, the classification algorithm of scientific and technological information resources is optimized, and the classification recommendation system of scientific and technological information resources is designed according to the calculation results, so as to realize the goal of recommending resources according to different user requirements. Finally, the experiment proves that the scientific and technological information resources recommendation system based on user demand analysis can better provide the required information resources for users and facilitate resource searching.

Keywords: Demand analysis; Scientific and technological information resources; Recommendation system

1. Introduction

In recent years, along with the computer technology, storage media and network technology has made the breakthrough and the establishment of DICOM standard, the user demand for science and technology information is increasing, as a systematic project and is not a simple system installation, recommend system construction on the implementation of science and technology information resources is often a lack of effective planning and strategy, the system planning and the optional the gender is strong, eventually lead to system can't play to the role of the real and effective, and cause personnel and the waste of money[1]. Therefore put forward based on user demand analysis system of science and technology information resources recommended building, analysis of user needs, science and technology information resource recommendation algorithm, build the information resources of science and technology recommendation system, and the experimental verification, this method can effective planning of science and technology information resources, to maximize the resource utilization with the continuous development of technology, people more and more high demand for science and technology information resources[2]. However, at present, the information between different ownership units of scientific and technological information resources cannot effectively achieve interconnection and collaborative application and thus fail to meet the increasingly diverse information needs of users. This requires the integration and optimization of existing resources[3]. Therefore, in order to better understand the information needs of front-line technology users, and to provide more accurate and high-quality services for the majority of scientific and technological personnel, so as to provide more effective scientific and technological information security for scientific and technological innovation and technological progress. Through the analysis of user research methods and methods, the acquisition and processing of user characteristic data and survey results, the information demand rules of different types of users are studied. In the comprehensive research of various kinds of user information science and technology, on the basis of analysis of users' information demand, and summarize the user in the use of the main problems existing in the process of information resources of science and technology, and puts forward the method to solve the problem, meet the demand of information service strategy, so as to realize the information service system to help improve the scientific and effective, effective planning of science and technology information resources.

2. Establishment of Recommendation System for Scientific and Technological Information Resources based on User Demand Analysis

2.1. Feature collection of user demand information resources

Scientific and technological information resources are infinitely rich, and can be divided into electronic books, paper reports, fact data, reference books, patent standards, software, network resources and so on[4]. As a huge open information resource database, network resources have incomparable advantages in the number of resources, resource distribution, carrier form, dissemination range, update speed and access convenience, etc., making it the most frequently involved and most concerned information resource feature collection field[5]. The purpose of information collection is to better acquire and utilize these resources. The collection of information resources is the basis of information service and the premise of the development and utilization of information resources. Understanding the collection characteristics of scientific and technological information resources and following certain collection principles can help us improve the collection quality of scientific and technological information resources and provide researchers with stable and effective scientific and technological information resources[6]. The principles of information resource feature acquisition are: academic, academic, intelligence, comprehensiveness and reliability.

In the process of collecting characteristics of information resources, the target users and their service needs should be investigated first, and then the actual demand should be analyzed based on the survey results[7]. In this way, the collected information resources can basically meet the real expectations of users. The flow of information collection is shown in the figure below.

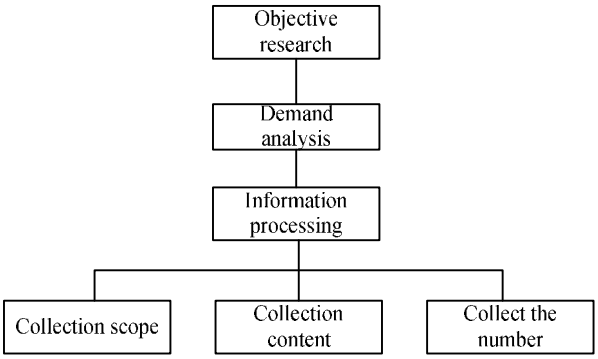

Figure 1. Characteristic collection process of scientific and technological information resources

As can be seen from the above figure, the analysis of information resource needs to determine the target group, collection scope, collection content, collection quantity and other specific collection contents[8]. Different acquisition strategies are adopted for different information resources. The collection method, way and technology of information resources should be determined according to the specific situation, and the collection plan should be made. It is an important precondition to make a reasonable information resource feature collection plan. The collection plan of information resources characteristics should be unified, comprehensive and flexible, and the collection strategy of information resources should be adjusted timely according to the changing collection results to improve the collection efficiency. After the collection plan of information resource characteristics is made, the information shall be collected in a wide range according to the collection plan, in accordance with the established collection content and in a scientific way[9]. In case of unexpected changes in the collection process, it is necessary to timely track new situations, find new problems, timely analyze the causes, track the collection process, and timely adjust the collection plan to obtain updated and valuable information. The purpose of information resource evaluation is to provide users with high-quality information services. Evaluation indexes of information resources generally include: depth and breadth of information subject, timeliness and economy of information collection, accuracy and reliability of data collection, timeliness of resources, easy access to resources, organization and classification of resources, etc.

2.2. Feature classification algorithm of scientific and technological information resources

User information awareness is weak. Users' lack of understanding of information will affect their demand for scientific and technological information. In addition, due to the implementation of paid services in the whole process of information acquisition, it hinders the generation and strength of users' motivation to use economically[10]. What's more, only a few scientific journal articles are available through paid online services. However, some information, such as conference materials, government science and technology projects or internal information of other units, is difficult to obtain through normal channels, which restricts the sharing and mobility of effective information. China's information user groups have not yet established the market concept that access to information is a kind of high consumption, which is related to users' understanding of information, and the government lacks support and guidance for the cultivation of information market. There are obstacles in the ability to

obtain user information. Retrieval tools are the main way to obtain information. If you are not familiar with the retrieval tools, you can't get effective information. Because many scientific research workers are older now, they do not have much knowledge of computer, are not good at using network and computer, and especially lack relevant knowledge of network retrieval technology and database.

Due to the lack of unified planning and standards, the duplication of scientific and technological information is serious, and the coordination is not in place. For the sake of pursuing interests, all online scientific and technological information suppliers tend to jump on the bandgap, lack of clear division of labor in content, and are incompatible with each other in technology, data format and standards, leading to a large number of duplication of scientific and technological information content. At present, the service content of scientific and technological information resource service system mostly stays in the aspects of information consulting, printing and downloading. Deep data mining and utilization rate of scientific and technological information resources are affected due to the lack of deep information processing and analysis, research and analysis reports or personalized services. Therefore, the recommendation algorithm of scientific and technological information resources is proposed, and its algorithm is shown below.

$$\mathrm{sim}(a,b)=\frac{\sum_{i=1}(r_{a,j}-ra)\sum_{i=1}(r_{b,j}-rb)}{\sqrt{\sum_{i=1}(r_{a,j}-ra)^2\sum_{i=1}(r_{b,j}-rb)^2}} \quad (1)$$

Where, ra, j, rb and j are user a's and user b's scores for the selected item j, sim (a, b) represents all items jointly scored by user a and user b, and represents the average scores for all items jointly scored by user a and user b.

$$E=\frac{1}{2}\sum_{i=1}^{n}\sum_{j=1}^{m}I_{ij}^2(V_{ij}-p(Ui,Mj))^2 \quad (2)$$

$$E=\frac{1}{2}(V_{ij}-p(Ui,Mj))^2+\frac{k_u}{2}U_i^2+\frac{k_m}{2}M_i^2 \quad (3)$$

The existing recommendation system of scientific and technological information has disordered information distribution and uneven quality. The openness and freedom of the Internet make it easy for anyone to post information online. As a result, formal publications and informal publications are intertwined, academic information, business information and personal information are mixed into one, and information resources are highly dispersed. By scoring user demands, this algorithm can effectively avoid these problems.

2.3. Establishment of recommendation system for scientific and technological information resources

In a sense, the construction of recommendation system of scientific and technological information resources is a kind of demand economy and a kind of competition economy. Under the condition of market economy, the demand for information is more important and urgent in the developing society. To effectively promote the sharing and application of scientific and technological information resources. To meet the increasingly diverse information needs of different users. It provides the corresponding language processing resources for the construction of the push of scientific and technological information resources, and at the same time assists in the construction of the applied domain ontology, so as to provide users with quality services. The construction of the recommendation system of scientific and technological information resources should start from the following aspects. Strengthen basic education and training, in view of the current science and technology information resources utilization rate is not high, to increase publicity. In form, we should make full use of all kinds of media, adopt flexible ways, and carry out targeted information publicity for target groups. Content, do not transfer information published information, but also on the coverage of information resources, update cycle, retrieval methods and other relevant content to guide more users. In addition. Also completes the training work, such as compiled by setting up network lectures, tutorials and online information such as navigation systems, resource guide, set up information service way, enrich education content, enhance the user's network retrieval ability training, make the information users to be able to see information as a commodity, so as to do consult information professional services or information required to buy the product. The specific contents of its recommendation system are shown in the figure below.

In addition to the above, the threshold for the use of online scientific and technological information resources should also be lowered. Internet resources have considerable requirements for users' education level and network retrieval skills, which is the case for the history of online scientific and technological information. The absolute majority of users of online scientific and technological information are highly educated people, who should have received basic education of computer and network application. However, they still feel distressed and trapped in the use of online scientific and technological information. It can be seen that the retrieval skill threshold of online scientific and technological information has become an important factor restricting its development. In addition, the problem of high charges for paid information also restricts the use of information resources by users, especially for personal charges, which is still a threshold that cannot be ignored for users. So. Starting from the promotion and development of online scientific and technological information, online scientific and technological in-

formation providers should improve the simplicity and universality of system operation and find the best profit model. We will lower the threshold for the use of scientific and technological information and open up a wider market.

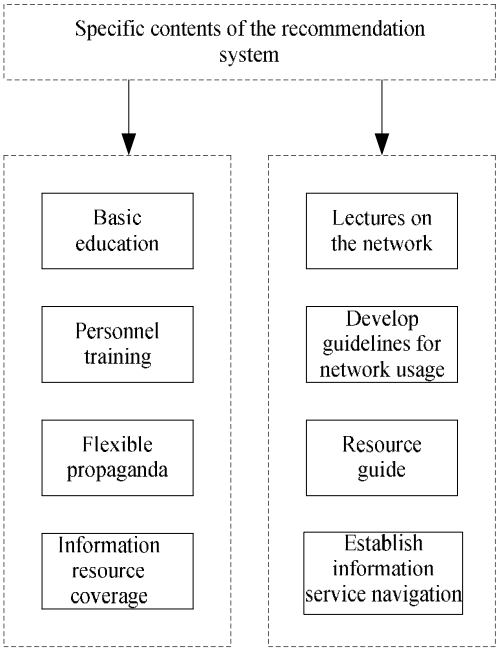

Figure 2. Details of the recommendation system

To improve the service capability of the information system of science and technology resources, the service of the information resources of science and technology on the Internet in China is not in place. No matter the user knows the science and technology information resource information. Or the need for personalized retrieval. Current services are difficult to satisfy. So. Science and technology information service institutions should strengthen their own service capacity building, so that the information institutions talent to the comprehensive direction of development. Can basically achieve multidisciplinary, multifunctional requirements to meet the growing demand for high-end information. The workflow of recommendation of scientific and technological resource information is shown in the figure below.

Can be seen from the above, in the face of a disorderly confused network information resources, the user is no longer the pursuit of fully grasp all the information related to a problem, and hope to be able to quickly and accurately obtain the key information needed for a complete solution, users' information demand is gradually from a lot of general information needs to solve the problem of quality information requirements in one of the key direction of development, which requires developers to adapt to the trend of network information resource. Set up the quality consciousness, timely and accurately grasp the user demand information, develop the service varieties to meet the user's high grade. Therefore, the main measures to improve the content quality of online scientific and technological information should be to unify the standards and norms of online scientific and technological information resources, integrate online scientific and technological resources, and establish a unified online scientific and technological information integrated management platform.

3. Analysis of experimental results

At present, there are many kinds of scientific and technological information resources, such as newspapers, radio, television, books, periodicals, Internet and so on. With the development of computer technology and network technology, the way of information transmission and the way of readers' reading have undergone profound changes. The new information environment has broken the traditional closed mode of the library, and the information resources have developed from the traditional printing type to the electronic and network diversified directions. But existing recommendation system construction on the implementation of science and technology information resources is often a lack of effective planning and strategy, the system planning and the optional the gender is strong, eventually lead to system can't play to the role of the real and effective, and cause personnel and the waste of money, therefore put forward based on

user demand analysis system of science and technology information resources recommended building, in order to maximize the resource utilization. In order to verify the feasibility of the algorithm, the existing sci-tech information resource algorithm was set as the control group and compared with the proposed sci-tech information resource recommendation system based on user demand analysis. In order to ensure the accuracy of the experimental results, the experimental parameters were set. The experimental parameters are shown in the table below.

After setting the parameters of scientific and technological information resources, the simulation experiment is carried out, and the results are shown in the figure below.

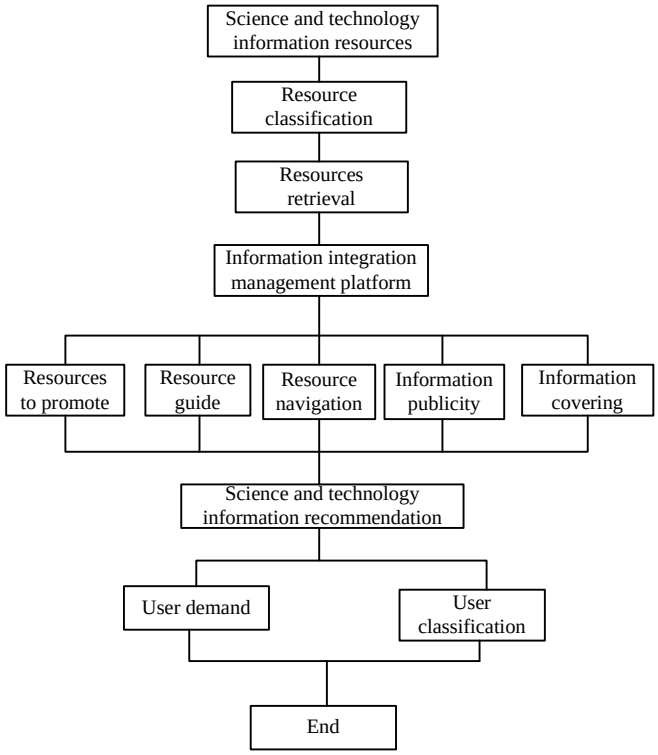

Figure 3. Workflow of recommendation of science and technology resource information

Table 1. Experimental parameters

Project	Parameter
Data (bar)	10000
Science and technology information resources category	4
Resource initialization (%)	0
Staff (name)	4
Working hours (ms)	1500

As can be seen from the above figure, the proposed recommendation system of scientific and technological information resources based on user demand analysis is better than the existing methods in the processing of scientific and technological information resources. The system can use its own convenient conditions to establish a user database, as far as possible to achieve a one-to-one service, to understand the special requirements of each individual user and fill. For example, the continuous attention to a problem, as soon as the latest scientific and technological information, in the first time through E-mail and other ways to inform users. To update, faster and more complete information content to meet the special needs of researchers.

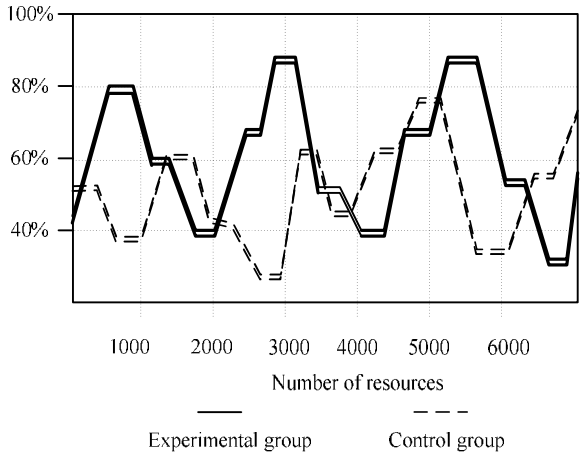

Figure 4. Experimental comparison results

4. Conclusion

With the continuous development of computer technology, the user of information resources of science and technology is increasing, the original technical information resources system optional the gender is strong, can't reasonable use of science and technology information resources, wastes the resources of money, so based on the user requirement analysis of recommendation system of science and technology information resources building, through comparing with the existing system of science and technology information resources recommended test, proved that the system can be effective planning of science and technology information resources, maximize resource utilization.

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