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University Library Service in the Era of Big Data

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ABSTRACT. *With the continuous promotion of smart campus construction, the rapid development of big data era greatly promotes the process of University Library Intelligence. Under the background of Smart Library, the construction of book micro service is going to a higher level. In the era of big data and micro data, the application of artificial intelligence technology can be improved, and the convenience of big data service platform can be improved. This paper analyzes and summarizes the research status of micro service in university library, and summarizes the research direction, hot spots and difficult issues of Library micro service. Domestic and foreign related literature database access to relevant documents, guidance, analysis and summary. This paper puts forward the definition of micro service in University Smart Library, and summarizes the research direction of micro service in university library. This paper takes MVs intelligent technology as the research topic, analyzes the development status of MVS intelligent technology, and the future development trend of MVS technology in the era of big data. The experimental results show that this study is of great significance for the establishment of micro service in University Library under the background of smart campus in the era of big data.*

KEYWORDS: *Big Data, Smart Library, Micro Service And Personalized Service*

1. Introduction

In the information age, micro platform carries out publicity and promotion services through pictures, videos, texts, music, links and other related information, which is called micro service [1]. By December 2020, there are more than 930 million instant messaging users and more than 890 million short video users. After wechat, micro film and micro music have appeared one after another, and people have gradually entered the era of micro information [2]. In the context of big data, it takes users as the information receiving and dissemination center, relies on a variety of social media information technology, and provides a graphical, personalized and convenient service through a variety of mobile communication devices. It is a "anytime, anywhere" dynamic service, and various service methods vary from person to person [3]. The official account of library is the most common and effective micro service at present. Readers can book seats in the library through the

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official account of the library, and can also actively track relevant books and materials [4].

With the advent of the era of big data, mobile search has become a hot topic in the field of big data technology and information science. Mobile visual search is an important research topic in the field of information search. Mobile devices are becoming a common platform for visual search and mobile augmented reality applications [5]. For object recognition on mobile devices, mobile visual tag search and recognition has become one of the most influential core technologies. Camera is just like the search window of browser, it is the entrance of mobile visual search. Through video or image recognition algorithm to realize "automatic extraction and recognition system of visual label recognition", what you see is what you get [6]. Users can use the camera of mobile devices to obtain images or videos from reality and upload them to the cloud server. The cloud server can analyze and process the photos uploaded by users, and search for other auxiliary information of search results such as video, audio and related web pages. Can be returned, links and other integration of the mobile phone lens, image layering and visual recognition, to provide users with a smooth experience. MVS technology-based "pailigou", "intelligent scenic spot navigation" and other related software have been applied in online shopping, intelligent scenic spots and other fields [7].

Big data technology plays an important role in promoting the development of Library micro service and improving its influence. Big data technology has injected fresh blood into library micro service, provided a new development direction and raised its development limit. The micro service of library develops continuously from basic service to deep service. It provides a convenient and fast learning materials and literature consulting environment for college teachers and students [8]. In order to promote the rapid, stable and healthy development of Library micro service, the developers of micro service platform of relevant university libraries can actively access the Internet or integrate into the big data technology strategy of local governments and cultural departments, so that the micro service platform can become the main battlefield of public cultural network services [9]. At the same time, it can promote the micro service demand of university library users, but under the rapid development, many problems have emerged in the micro service of University Library in the era of big data. This paper puts forward some constructive suggestions for the construction practice of University Library micro service, in order to achieve good development [10].

2. Method

2.1 Sampling Survey Method

The individual and group portraits were randomly sampled and stratified sampled respectively, and the number of tags confirmed by users was recorded. The sample accuracy was calculated by label P_i = (the number of correct tags / total tags)), the average $\bar{P}$ (i.e. the average tag accuracy) and variance σ^2 measure the

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advantages and disadvantages of the model (i.e. the larger $\bar{P}$and the smaller σ^2, the more accurate the model), and provide feedback for the validation of library user data, model adjustment and optimization.

(1) Individual portrait assessment

$$\overline{\mathrm{P}} = \frac{1}{\mathrm{n}}\sum_{\mathrm{i}=1}^{\mathrm{n}} P_i \text{ (N is the number of random samples)} \quad (1)$$

$$\sigma^2 = \frac{1}{n-1}\sum_{i=1}^{n}(P_i - \overline{\mathrm{P}})^2 \quad (2)$$

(2)Group portrait assessment

$$\overline{\mathrm{P}} = \frac{1}{\mathrm{N}}\sum_{\mathrm{h}=1}^{\mathrm{L}} N_h \bar{P}_h \quad (3)$$

$$\sigma^2 = \sum_{h=1}^{L}\left[\frac{N_h}{N}\right]^2\left[\frac{N_h - n_h}{N_h}\right]\frac{\sigma_h^2}{n_h} \quad (4)$$

L is the number of layers, n is the total number, where N_h、n_h、$\bar{P}_h$、σ_h, It refers to the total number of samples in layer h, the number of samples, the average and standard deviation of sample label accuracy.

Evaluation index of image retrieval

(1) Recall calculation retrieval system detects the proportion of related images in the total number of images from the image set, which reflects the comprehensiveness of the retrieval results, as shown in formula (5)

$$Recall=\frac{N_R}{N} \quad (5)$$

(2) Precision ratio measures the accuracy of the results returned by the retrieval system, such as (6)

$$Precision=\frac{N_R}{N_A} \quad (6)$$

(3) F is the weighted harmonic average of recall and precision (7), P is precision, R is recall, α is weight parameter.

$$F = \frac{(\alpha^2+1)P*R}{\alpha^2(R+P)} \quad (7)$$

2.2 Data Acquisition and Processing

It is easy for the library to obtain the data of readers. Because its service objects are mainly students, teachers and researchers. The purpose is to provide readers with better knowledge services. With the permission of readers, the library can collect its registration information, such as name, age, specialty, research direction, contact information, address, nationality and other attribute characteristics; use the log data and background database of library user management and service platform, system portal or mobile intelligent terminal equipment, Collect users' behavior data such as retrieval, reading, clicking, browsing, collection and forwarding; use web crawler

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tools and log analysis technology to obtain registered users' comments and rating data; combine text mining and emotion analysis to obtain users' emotional preferences; also use online questionnaire survey, online interview or remote questioning to collect readers' relevant data; collect users' emotional preferences by using web crawler tools and log analysis technology; Collect log data to retrieve reading records, and obtain user preferred knowledge fields (such as natural science, history, literature, etc.), knowledge types (such as papers, books, patents, etc.), and knowledge forms (such as text, voice, video, pictures, etc.); With the help of global positioning system (GPS), radio frequency identification technology (RFID), monitors, intelligent wearable devices, sensors and so on, user scenario data are collected for mining and analyzing readers' retrieval intention and knowledge preference in different scenarios. In view of the incomplete, inconsistent and false data of the original user data collected, it will affect the accuracy of user portrait construction, and even mislead the system decision-making. Therefore, data cleaning, integration, conversion, specification and other preprocessing are needed. Data cleaning is to remove irrelevant data and duplicate data from the collected original data, and carry out actual investigation and correction of abnormal data. There are inconsistency and heterogeneous problems in user data expression from different data sources, so data integration is needed. And convert to a unified standard for collation and storage. Through the pretreatment of the original data, it can provide a good data basis for the construction of the follow-up model, and improve the accuracy and applicability of the model.

2.3 Portrait Modeling

After obtaining sufficient user data, it is necessary to model the user feature data to realize the tagging of user multi-dimensional features, so as to build a clear user portrait. Tag is an easy to understand and recognize feature identifier to define the target object, which has important features such as semantic and short text. Semantic makes people understand the specific meaning of tags more intuitively, while short text is convenient for computer to extract, identify, process and analyze tags. Tagging is the core of user portrait. Through tag recognition, the computer can automatically complete classification statistics. And the depth of the label mining. Feature tags complement each other in order to accurately and comprehensively reflect the user portrait. The feature is to mine and refine user data, extract valuable information from complex data, and intuitively express and distinguish independent users.

3. Experiment

3.1 Experimental Investigation Objects

In order to make a more in-depth analysis of the current situation of University Library micro service practice in the context of the rapid development of the era of big data, this paper selects the university teachers and students in a certain place for

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relevant investigation and research. Through the investigation of the participants in the use of mobile visual search in the micro service of university library, the influence of mobile visual search on the practice of micro service of university library is obtained according to the data of the survey results. Based on a comprehensive review of the research results of the research subjects, this paper analyzes the problems and reasons of mobile visual search in the practice of University Library micro service based on the data obtained. This paper uses the technical characteristics of big data to explore the Countermeasures of mobile visual search in the practice of University Library micro service. The data are processed and analyzed comprehensively.

3.2 Experimental Research Design

In the form of questionnaire survey, the respondents can choose according to their attitude to each question. The overall structure of the questionnaire sample is consistent with the development trend of Internet users in Chinese colleges and universities; 100% of the sample users have more than 4 years of Internet use experience, 4.21% of the sample users have no direct experience in using MVS, and all other participants have at least half a year of use experience, The number of users who used it frequently and almost every day accounted for 78.52% and 94.33% respectively; the recognition of small program code and payment QR code accounted for 30.48%, which was the most commonly used MVs application, followed by image recognition (29.25%).

4. Results

4.1 Analysis of Experimental Research Results

It can be seen from table 1 above that cognitive usefulness and cognitive ease of use are the main factors to be considered in the study of MVS users' action intention. Mobile visual search service developers should first pay attention to users' requirements and experience from the perspective of cognitive usefulness and ease of use. Cognitive usefulness affects users' choice of multiple MVs applications, mainly because the visual objects of other applications are related to consistent effects. Convenience knowledge is related to the familiarity of MVS application users, and the antecedents of MVS users' usefulness and convenience cannot be generalized. In terms of the convenience of identification, the power of user cognition is greater than that of system quality. From the perspective of query efficiency factor, the expected confirmation degree is improved, and the user perceived usefulness is improved.

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Table 1. Survey on the use of MVS in micro service of university library by university teachers and students

	Perceived usefulness(PU)	Perceived ease of use(EOU)	Expected confirmation(EC)	System quality(SYU)	Relative superiority(RA)	Self efficacy(SE)	Innovation(INN)
Perceived usefulness(PU)	0.930	-	-	-	-	-	-
Perceived ease of use(EOU)	0.776	0.887	-	-	-	-	-
Expected confirmation(EC)	0.749	0.722	0.910	-	-	-	-
System quality(SYU)	0.747	0.775	0.739	0.807	-	-	-
Relative superiority(RA)	0.738	0.720	0.739	0.805	0.919	-	-
Self efficacy(SE)	0.689	0.807	0.680	0.765	0.697	0.897	-
Innovation(INN)	0.653	0.686	0.676	0.716	0.657	0.715	0.875

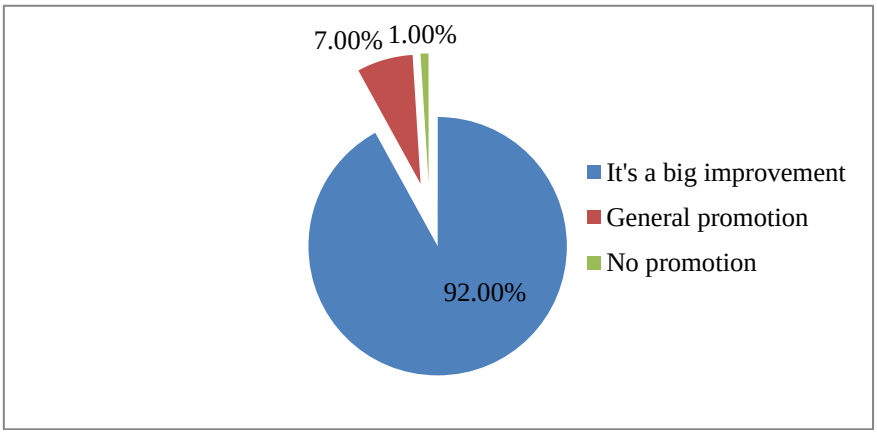

Figure 1 the use and promotion of MVS technology to university library micro service in the era of big data

According to the data in Figure 1, we can see the improvement of the use of MVS technology for University Library micro service in the era of big data. According to the data, 92.00% of the survey results show that the use experience of students and teachers' Library micro service has been significantly improved when MVs technology is used, and 7.00% of the questionnaires show the use of students and teachers' Library micro service The results showed that the improvement effect was general, and 1.00% of the questionnaires showed that the use experience of

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students and teachers did not improve. The application of big data MVs technology in the micro service of university library has a very important positive significance for the development of university teaching. It is of great significance for university students to use the library by putting big data technology into the construction of micro service informatization of relevant libraries, so as to improve the level of science and technology and the level of application service.

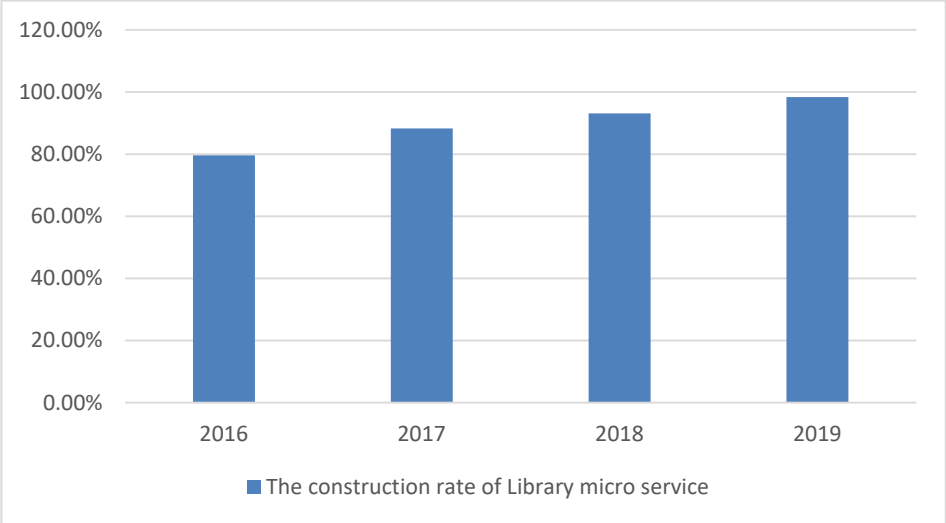

Figure 2. 2016-2019 University Library micro service construction

According to the survey results in Figure 2, we can see the current situation of the construction of micro data service in university libraries. According to the data, universities in China have begun to popularize library micro services in a large scale in 2016. Until 2019, the micro service of University Libraries in China was basically universal. The use of data technology in the micro service platform of university library has a very important positive significance for the allocation of university teaching resources. The reasonable allocation of library resources through big data technology can maximize the use of teaching resources to a great extent, and get more results at the least cost, which has irreplaceable significance for the modernization of China's universities effect. With the popularity of Library micro service platform, the next step should pay attention to the use quality of University Library micro service platform, so that it can better play its role in practice.

5. Conclusion

This paper shows the MVS technology, analyzes its technical characteristics, makes statistics on the construction of University Library micro service platform, and investigates the use of MVS technology in University Library micro service

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platform and the satisfaction of university teachers and students. Its purpose is to summarize the current problems in the practice of University Library micro service in China, and to show the view that we should use the high-tech in the era of big data to improve the experience effect in the practice of Library micro service. The development of big data technology has had a profound impact on the way, content, scope and other aspects of micro service, and improved its influence. University library can make full use of its own characteristic resources to carry out characteristic micro service, and use high-tech big data technology in micro service. The promotion of big data provides both opportunities and challenges for the development of University Library's Micro service. The library needs to provide users with meticulous services in order to keep pace with the times, better meet the needs of teachers and students, and play the role of serving university teachers and students.

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