

# Construction and Service of University Intelligent Library Based on Data Driving

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**Abstract:** When studying the challenges faced by libraries in the current big data environment and intelligent information service, we should further explore the construction idea of library intelligent information service system from the perspective of big data driving; Secondly, based on the information ecological chain theory and taking the library business process as the support and guidance, this paper constructs a big data-driven library intelligent information service system, which mainly includes three levels: infrastructure layer, data resource layer and service application layer, and discusses the functions and characteristics of each layer in detail. The research shows that the relevant system can integrate the library infrastructure, data resources, service applications and users, provide the development strategy of library intelligent information service driven by big data, reconstruct the business process of library intelligent information service, and realize the construction and development of library intelligent information service in the big data environment.

## 1. Introduction

With In recent years, big data and artificial intelligence have become a core driver of industrial development and economic planning. In the statement on Library and artificial intelligence issued by IFLA in September 2020, it is mentioned that artificial intelligence is reshaping the business model of libraries and advocating libraries to participate in cultivating users' data literacy, The library should also become the leader in the scientific research data chain. The reform of domestic university libraries in recent years has always focused on "data". According to the timeline of national economic and social development planning, the achievements in the field of Libraries during the 13th Five Year Plan period are remarkable. The construction of literature resources for "double first-class" disciplines; The second is the innovation of library service focusing on academic evaluation, institutional knowledge base and space service; The last and most important is the in-depth exploration on the construction and landing of the new generation library platform. Generally speaking, from literature resources to scientific research services, from librarians' literacy to business processes, the library has always followed the principle of "Data-Driven" and moved towards digitization and intelligence. As the key year of the 14th five year plan, 2020 is an important turning point in the transformation of university libraries. After the previous theoretical exploration, the university library has established the development path of "wisdom". Starting from this point, this paper intends to explore some planning ideas that should be made by the University Library in realizing the digital function, deeply participating in teaching and scientific research and reconstructing the Library Alliance Service in the node stage of the 14th five year plan.

It is still a difficult problem to build a smart library construction and development model of big data-driven library smart information service system to support management coordination, decision support, smart service and user smart activities. The main reasons are three challenges: the lack of systematic support for library smart information service by library infrastructure construction. At present, the intelligent service of the library has only reached the "intellectualization of things", and the construction at the infrastructure level only stays on the local support of intelligent equipment for business service process. To realize the intelligent information service of the library driven by big data, we need to build a systematic and global intelligent service system based on intelligent technology and facilities; Library big data has not yet achieved unified organization and management. In the big data environment, the massive library data resources make it more difficult for users to obtain fine-grained knowledge; Different data standards also lead to the existence of data islands,

which seriously affects the effective filtering, discovery and mining of the value of big data resources in the library; In addition, the library pays more attention to static resources, and the real-time and dynamic stream data has not been utilized, and these data are often needed to support users' intelligent activities.

The traditional library service architecture is difficult to meet the needs of smart information services driven by big data. At present, the library can not provide intelligent big data collection, decision-making support and decision-making support system based on smart data collection, analysis and construction. Therefore, based on the challenges faced by Libraries under the current big data environment and the related research status of intelligent information service, this paper constructs a big data-driven library intelligent information service system. Firstly, from the perspective of big data driven, this paper discusses the construction idea of library intelligent information service system; Secondly, based on the information ecological chain theory and guided by the library's business process, this paper constructs a big data-driven library intelligent information service system, which mainly includes three layers: infrastructure layer, data resource layer and service application layer, and discusses the functions and characteristics of each layer in detail. The system can integrate the library's infrastructure, data resources, service applications and users, mine data wisdom from massive data resources through big data technology, and provide users with efficient, intelligent, accurate and personalized intelligent information services. On this basis, this paper puts forward the development strategy of library intelligent information service driven by big data, realizes the construction and development of Library Intelligent Information Service under the environment of big data, improves the cultural service level of library, and promotes social knowledge innovation.

Table 1 Development areas of Smart Library

Region	Proportion
Eastern Region	42.33%
Central Region	23.81%
Western Region	33.86%

## 2. Research status and opportunities of domestic Smart Library

### 2.1 Development status

Nowadays, there are many research papers on Smart Library in academic circles. If you look at it in depth, the research on Smart Library mainly focuses on the following aspects: one is the discrimination of the concept of Smart Library. Experts and scholars have discriminated between traditional library and mobile library, digital library and Smart Library from different angles. In the specific analysis of the connotation elements of the library, it mainly includes the discussion of librarians and space in the intelligent environment. Intelligent technology is an important driving force for the development of Smart Library. In terms of technology, the research of Smart Library mainly focuses on the Internet of things, artificial intelligence and blockchain, and optimizes the function and service experience of the library through technology. Since its development, smart library has experienced discussions from concept, theory to practice, and has gradually changed from the embryonic stage to the growth development stage. It is a model driven by policies, needs and environment in the new era. In the environment of "double first-class" construction and smart campus, the smart library is in the leading position in the construction planning of colleges and universities, and the pace is gradually accelerated, while the library bears more and more responsibilities for auxiliary teaching and scientific research. Smart buildings, smart resources, humanistic services and smart system platforms have become an important starting point for university libraries to carry out smart services.

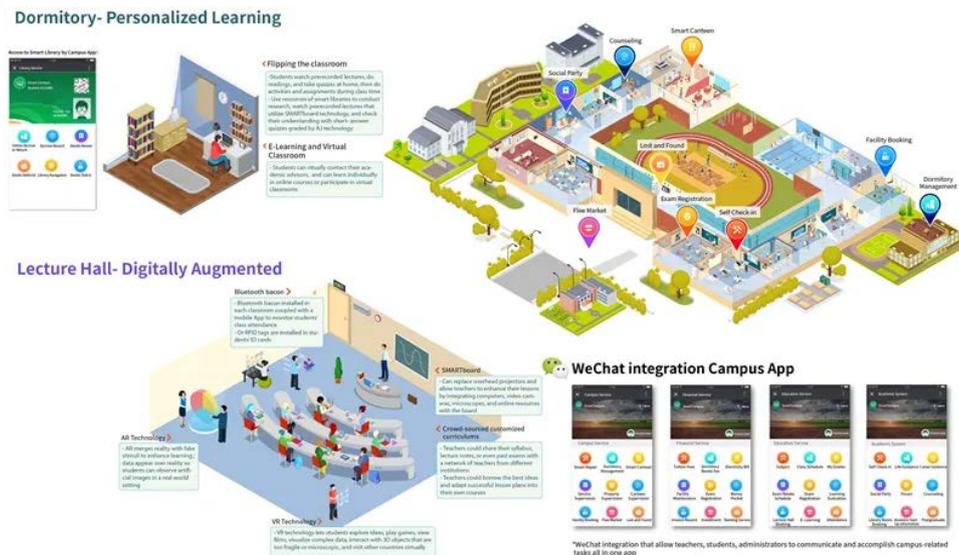


Figure 1 Smart Library

## 2.2 Development opportunities

New opportunities for the development of Smart Library in the face of the impact of the era of big data and the normal epidemic situation, the form of scientific research and teaching has undergone drastic changes, and there are two new development opportunities for the library. First of all, the intelligent development of libraries has become a consensus in the academic circles - in the era of wide application of new generation technologies such as big data, artificial intelligence and the Internet of things, it has become a consensus in the academic circles and the industry to speed up the construction of smart libraries and Smart Services with "Data-Driven" as the core. University libraries should be "steady and steady", take the express train of intelligent technology and lead the new form of Smart Library. At the same time, from the perspective of the current situation map, it has expanded the scope of the subject of "situation map" in the field of "number intelligence" and changed the subject of "situation map" to a greater extent. At the same time, the industry is also constantly beginning to practice the "Data-Driven" scheme. Secondly, the new business form of network teaching in Colleges and universities widens the service boundary of Libraries - during the epidemic period, all colleges and universities carried out online and offline mixed teaching mode, and colleges and universities, teachers and students are gradually adapting to this normalized online education situation. This new normal also strengthens the position of the library as a data manager in the teaching link. According to statistics, in early February 2020, when the epidemic is still serious, the frequency of online service use of the University of Macao library increased by 54% year-on-year. The road of digital transformation is undoubtedly the best choice for the library's "14th five year plan". Facing the normalization of the epidemic situation and the national "double first-class" strategic layout, university libraries take the initiative to build a "bridge" between online teaching and students, and consciously do a good job in the support, transmission and guarantee of online education resources. By embedding teaching services, expand teaching methods, optimize teaching space, broaden service boundaries, and fully support education and teaching

## 3. Development strategy of library intelligent information service system driven by data

With the initial development of library intelligent information service, the wide application of artificial intelligence technology, the collaborative integration of multi-source heterogeneous data and the construction of intelligent environment provide a new development strategy for us to deepen the construction of library intelligent information service system driven by big data.

### 3.1 Construction of library infrastructure support system based on Artificial Intelligence

At present, the application of big data technology, Internet of things technology, artificial

intelligence and other technologies to the construction of the library can make the library more automatic and intelligent. With the technical and equipment advantages of intelligent sensing and sensing equipment, virtual reality and intelligent robot in the Internet of things, improve the humanization, convenience and efficiency of services, and make the library truly intelligent. For example, in terms of intelligent sensing system, the library makes the collection resources and space management convenient with the application of Internet of things sensors. First, through RFID, indoor navigation robot and other technologies, it can facilitate book access, shelves and management, and guide users to obtain collection resources more conveniently; Second, face recognition, infrared detection and other technologies can perceive user behavior. The library generates user portraits according to user behavior data, predicts user needs, and provides data support for personalized user recommendation and services; In addition, augmented reality, virtual reality and other technologies help to provide users with virtual and intelligent space experience.

### **3.2 Realize the unified organization and management of data based on Semantic Web technology**

With the in-depth development of big data technology, the library is also transitioning from data environment to knowledge environment, and the knowledge content is moving towards associated data and networking. The big data of the library is not only distributed in databases in different fields and different carriers, but also to realize the integration of knowledge, cross fields, interdisciplinary Cross industry collaboration and integration can break the "data island", discover new connections of data, and realize the doubling and generalization of the value of big data. With the help of semantic web technology, any data object can be semantically labeled and linked, become logically meaningful and interrelated knowledge objects, and form a huge knowledge map. For example, the library organically associates books, journal papers, paper affiliated data, data sets, patents, clinical experiments, institutions, conferences, authors, funded projects, and even the number of downloaded readings, identifies, describes and marks the correlation between these objects, forming a knowledge map in the form of related data, Build a map database system management platform based on knowledge map to realize semantic, fine-grained intelligent retrieval, document mining, knowledge discovery and other intelligent information services based on knowledge map.

### **3.3 Create an interactive library intelligent service ecosystem**

The application purpose of intelligent technology is to help create an intelligent knowledge environment that can stimulate people's creativity by coordinating the relationship between technology, resources and people, attract potential user groups, promote knowledge utilization and innovation, and make the library a space for condensing and creating wisdom while activating the library's intelligent service ability driven by user demand. Libraries can integrate users' research and learning achievements with the help of library knowledge network into the construction of library knowledge network, and then form a complex knowledge ecosystem. In addition, the library expands and integrates big data in the fields of education, academic research, publishing, enterprises and social public management, integrates and connects various knowledge environments, changes from institutional knowledge base to a platform supporting knowledge analysis and decision-making, supports the development of industry fields, further promotes the renewal of knowledge network, and attracts more people to join the ranks of knowledge sharing and knowledge innovation, Activate a wider range of intelligent activities and intelligent services, so that the library can truly become the center connecting cross domain research, innovation, learning and even various knowledge intensive social activities, so as to realize the continuous growth of new wisdom in the knowledge network ecosystem.

## **4. Conclusion**

Big data deepens the connotation of library intelligent information service and provides a new development direction for the development of library intelligent information service. Based on the information ecological chain theory, the library establishes an intelligent information service system

including infrastructure layer, data resource layer and application service layer, and uses technologies such as big data, cloud computing, Internet of things and artificial intelligence to complete the unified representation, organization and storage of Library big data such as collection data, user data, business data and Internet of things data. It can optimize the layout of the library and optimize the user's personality by using the data of time and space. The smart information service system of the library driven by big data is conducive to accelerating the pace of self transformation, transformation and upgrading of the library. However, the development of smart libraries and smart information services in the big data environment still requires us to adopt diversified development strategies, use artificial intelligence technology to establish knowledge association and create an interactive smart service ecosystem, so as to make the future library move towards an automatic, intelligent, efficient, ubiquitous and personalized smart library.

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