

# **The Way to Construct the Intelligent Library**

## **--Taking Nanyang College Library as an example**

Ying Nie

School of Guangzhou Nanyang polytechnic university, Guangzhou 510925, China.

308548139@qq.com

**Keywords:** Intelligent library; Internet of things technology; RFID system.

**Abstract.** With the rapid development of the information age, the concept of intelligent city and intelligent campus is becoming popular. Based on the construction of RFID intelligent library, this paper discuss the reform scheme of Nanyang College Library. The project is mainly to apply the new knowledge of the Internet of things to the construction of library. The project have three stages: First stage: To build an intelligent library of Nanyang College Based on RFID system. Second stage: To build book resources sharing in different universities, borrowing and returning books from different college. Third stage: Through large data mining and intelligent analysis of all kinds of books to create a balance between supply and demands. Establishing an internet system to connect different Universities Library and Conghua New Library, laying the foundation for Conghua intelligent city.

### **1. The Research Meaning**

The nineteenth National Congress of the Communist Party of China has been successfully held. General secretary Xi Jinping is again at the forefront of the information revolution, conforming to the trend of the times, rounding the development and governance of the Internet, he put forward a series of new ideas, information resources are increasingly becoming an important factor of production and social wealth, the Internet is becoming the leading force for innovation driven development, profound changes in people's production and life, promote social development. In June 2015, Guangdong Province Library of science and technology and Industrial Technology Research Institute of Guangdong province industry development strategy research center and Information Industry Promotion Center, add "Guangdong province science and technology information and development strategy research "brand, becoming the important unit in "think tank service" plate of Guangdong Provincial Academy of Sciences , and it will have a new function to serve government's scientific and technological decision. To this end, the Guangdong provincial science and Technology Library deeply studies the strategic intention of Guangdong Provincial Committee and provincial government to promote the strategic adjustment of economic structure and the upgrading of industrial transformation, implementing the strategic deployment of the Guangdong Academy of Sciences to create a high-end platform for innovation driven development hub, for the target to support the innovation and development of technology and industry in Guangdong Province. Facing scientific research and decision making, protruding scientific and technological information and strategic research. [1]All kinds of data show that the construction of the intelligent library is imminent, and it is the only way for the development of the library in the future.

### **2. Feasibility Analysis**

#### **2.1 Traditional Library**

The traditional circulation management system in China's library is based on the application of magnetic strip and bar code technology, the magnetic strip is mainly used for the safety and burglary of books; the bar code is the only identity code of library's collection. But there are many problems in the management system, such as 1.the time consuming and consumption of book search and collection, 2.the resources of the CD-ROM are not easy to circulate, 3.the magnetic strip is easily demagnetization and the safety factor is low; After entering twenty-first Century, the number of

libraries introduced in China is increasing. Although the specific components and functional descriptions of the various libraries are different, the core basic functions are highly consistent. The technology is mainly applied to the self-help loan machine, the automatic bookshelf, the safety entrance guard and so on. At present, most libraries in our country are still based on bar code scanning for the management of book system.

## 2.2 Intelligent Library

The intelligent library is a dynamic information library management system based on the technology of Internet of things. Through RFID (Radio Frequency Identification, radio frequency identification) technology, combined with library management system, it can realize the information, remote and unmanned library management, even though the information collected by RFID, the book management system is excavated intelligently to get better management idea.

In 2008, the Shenzhen library launched the 24 hour self-service library system of urban blocks through independent research, and realized the interconnections between the libraries in the whole city based on the same management platform. At the end of 2011, the library of Xiamen University opened the personalized user service system of automatic seat selection, and realized the interconnection and interconnection between the readers and the library infrastructure. IN March 2012, the capital library alliance was formally established and ten Huimin initiatives were launched. The future is expected to pass the service mode in 60 libraries in Beijing city with only one reader card. In April 2015, the first real intelligent library in China was born in Yantian District, Shenzhen. The research and demonstration of the intelligent platform of Library Library in Yantian District based on the combination of culture, science and technology, networking technology, big data technology, cloud computing, mobile Internet and other means, based on the current mature industry automation, digitization, intelligent application system, developed in line with the development trend of the technology intelligence platform, to explore the implementation of the innovation of Library Service model [2].

## 3. The Idea of Constructing the Intelligent Library of Nanyang College

At present, there are many libraries in China, such as Xiamen University library and Shenzhen library. In the past 06 years, the exploration of Smart Library has been started, and good results have been achieved. The author also began to pay attention to the technology of Internet of things in 2010. In 2012, I published a dissertation on the application of the Internet of things in the campus network. I have been in Guangzhou Nanyang College for nearly 10 years and I have experienced two major changes in the college which is restructure of college leaders and the overall relocation of the campus. In the past ten years, the college has been growing. The campus library has been expanded from the first floor (about 180 m2) to a four story building with a total floor area of 420 m2. But the library construction in our college is still at the periphery of hardware. For the construction of software, the traditional bar code scanning system is still used in library management system. Based on this, the author combines his own major and IOT technology as the core, and puts forward a bold vision and overall goal for the Campus Smart Library.

Table1. Construction goal of Nanyang college smart library

Project phase	Target
The first stage	Building Nanyang college smart library based on RFID
The second stage	Building university library resources, to Share library resources in different place
The third stage	Big data mining, intelligent analysis of all kinds of book reading quantity, build book supply and demand balance

See Table 2 for details: The construction goals of the Smart Library of Nanyang College.

### 3.1 The First Stage: Building an Intelligent Library of Nanyang College Based on RFID System

The phase reference has been successfully run the "unmanned supermarket" (July 2017, Hangzhou, a subsidiary of Alibaba), the use of RFID storage capacity, can read the data characteristics of long and stable operation, the construction of "unmanned" library to achieve 7\*24 hours unattended,

automatic borrowing book mode. The reader only needs to hold a library card and safely pass the security door. An intelligent, unmanned library, which can be read at a distance, read multiple copies at a time, and automatically register a print list. See Figure 1 specifically: a blueprint for the construction of the library:

As you can imagine, when all the books are converted to RFID tags, the reader will borrow the book and no longer need to pass the front desk service. The RFID scanner at the door will automatically scan the reader's information and record the readers' books and other books.

The construction of the library requires only a small number of staff, no longer limited to 8 hours of work. Readers can go to the library at any time without time limit. There are self-help computer inquiries at the gate of the library, which can quickly help readers to search for the required information and coordinate their coordinate. There are automatic registration and printing lists at the front desk. Readers can enjoy electronic books downloading, surfing, and resource sharing and so on.

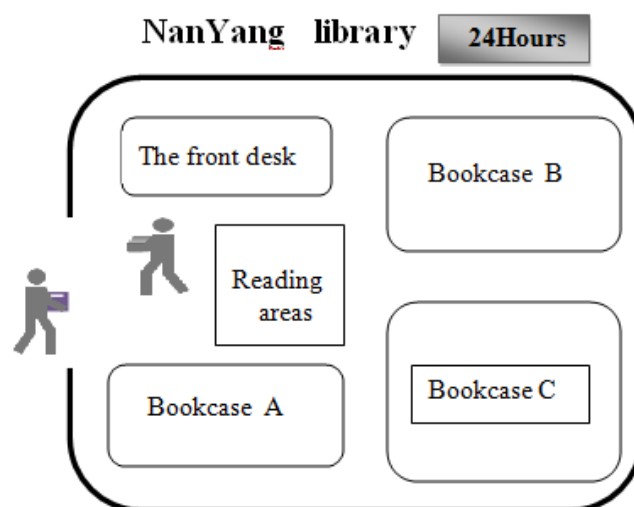


Figure 1 A blueprint for the construction of the library

### 3.2 The Second Stage: Building Books and Resources Sharing in Colleges and Universities and Borrowing Books From Different Places

In the last two years, sharing a single car has brought us a deep thought. The success of sharing a single car is not much of its technology, but the convenience it brings to people. With the sharing of single car fire, other shared models, such as sharing cars, were followed. The library is the first to open a shared pioneer as a Book of borrowing and reading. For the books with RFID tags can be tracked at any time, so even if there is a large number of books outflow, there is no need to worry about increasing the workload of library managers due to confusion or loss of books.

Currently, there are seven universities in Guangzhou, including Nanyang college, water conservancy college, China soft college, engineering college, urban construction college, huaxia institute and electromechanical college. The author believes that an important form of information development is resource sharing, and electronic resources can be Shared in the cloud, so how can paper books be Shared? Paper books are physical, so you have to use the Internet of things technology. In the construction of the library, we can learn from the sharing cycle operation mode. The author envisages that if we can combine the library of various universities and even the library and Guangzhou library, we can not only share the library resources, but also enjoy the convenience of other books in other places (Figure 2).

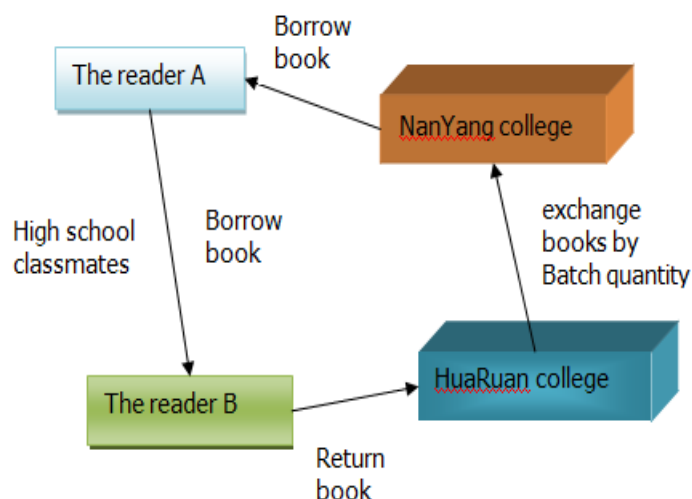


Figure 2 Borrow and also books in different place

### 3.3 The Third Stage: Large Data Mining, Intelligent Analysis of All Kinds of Books, and the Balance Between Supply and Demand of Books

With the explosive development of the information age, the database is rising every day at its amazing speed. So there is a problem for each data analyst to face and deal what is effective data that can be used for me? What is garbage data, which can be directly delete. However, depending on the supply and demand, there may be some data here in A, which is a waste, but it is a valuable set of data that B needs. Therefore, data mining has become one of the most valuable tasks of the century. By analyzing the data and mining the potential value of data, we get some more useful arguments through deep research and calculation of data, which is the necessary work of data mining. The core value of large data is: The value of the sum of the data is far greater than the sum of the value of the data.

Through communication with the director of the Nanyang library, the author visits the Nanyang College Library. The book borrowing data from September 1, 2017 to September 30th were intercepted. Through data analysis, we found that the average number of people reading in Nanyang library was 1254 persons / day (the data did not exclude the same person entering the library two times on the same day, counting for 2 times), including 782 women / day, 472 men / day. The average borrowing book is 213 persons / day.

Taking September 18, 2017 as an example, the type and number of books borrowed by the library on the same day are shown in Figure 3. Through this data, further refining and analysis can be carried out to get more in-depth research results. The above analysis is based on the conclusions of the one day reading volume and the data borrowed from the library in September 18th. Objectively speaking, although the conclusion is deep, it lacks support. We need to get the most accurate data, which should be based on massive data research, comparison and analysis, and use various computing methods to get effective conclusions. The core task of data mining is "big". Comparing with a large number of data and drawing useful conclusions is the ultimate goal of intelligent library application.

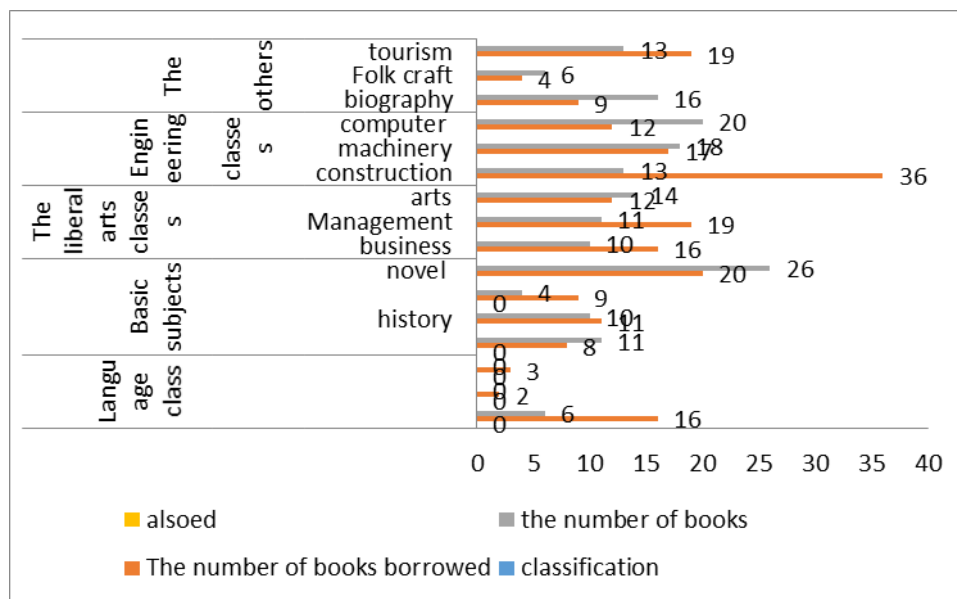


Figure 3 ultimate goal of intelligent library application.

#### 4. Summary and Prospect

With the development of the information age, the rise of Internet plus and networking, the university library should play a summary of the value in the construction of first-class discipline, must strengthen the construction of discipline service platform resources [3]. The management idea of the traditional library is far from qualified for the distribution and sharing of modern resources. The construction of Smart Library is the embodiment of creativity, resources and services. It is the embodiment of integrated functions and efficient operation of libraries to achieve self-development and meet users' needs. It is also the active response of the library to the opportunities and challenges brought about by the digital technology and the digital environment. [4] Based on the Internet of things technology, big data platform, cloud technology, smart library, smart campus, smart city, and smart China, is our unlimited prospect for the digital information age, and it is the inevitable direction for the development of China's information industry in the future.

#### References

- [1]. Wei Dongyuan, wang chunming. Exploration of the construction of science and technology think tank in the regional science and technology library [J]. Library BBS, 2016, 36(12):70-75. 43/5000
- [2]. Wang Haishu. Application of RFID technology in library of China [D]. Anhui University, 2014. 32-33
- [3]. Nie Ying. The application of the Internet of things in campus network [J]. Mechanical engineering and automation, 2012, (05):191-192.
- [4]. Lli Min. Discussion on the construction of discipline resources in the discipline service platform of university libraries [J]. Modern intelligence, 2017, (11):98-104.