



# Research on Intelligent Retrieval Technology of User Information in Medical Information System Under the Background of Big Data

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**Abstract.** Intelligent information technology had made outstanding contributions to strengthening information management in hospitals and improving the level of hospital construction. It had become the key development object in the future of hospital intelligence information data management. As one of the most important data information in the hospital, the management of the user data of the medical information system had an extremely important influence and significance on the decision making of the future management of the hospital, the use of medical data, and the forensics of the judicial materials. The traditional manual operation and manual computer operation of the user data management model of medical information system had a direct impact on the development process of information intelligent management of the future hospital users. Therefore, the intelligent management of the important database of the medical information system user data was of great significance to the exchange and use of data experience within the hospital, and even the world, as well as the intelligent management of the hospital and the scientific and technological development of the medical future. Through the medical record management of the key information of medical system files, this paper effectively removes redundant data and improves data retrieval efficiency; it realizes accurate collection of medical information according to visualization technology. The effectiveness of the proposed method is verified by experiments.

**Keywords:** Big data · Medical information system · User information · Intelligent retrieval · Privacy protection

## 1 Introduction

After nearly a hundred years, the management and retrieval technology of the medical information system of user data has developed from a single information file to a high-tech medical information management discipline. As an important carrier to record patients' specific medical activities, their medical information not only provides raw materials for medical programs, teaching management, scientific research, hospital management and hospital management decisions, but also can be used to guide hospital decision management, specific business, medical statistics, education, scientific research, prevention, health care, medical results evaluation, health assessment, legal

appraisal, and treatment of doctor-patient disputes, history files and assessment directly or indirectly as important data, which has far-reaching significance for strengthening the information and intelligent development of medical specialty [1]. With the rapid development of science and technology and data application, the development of intelligent means and the in-depth study of modern medical management in hospitals, in order to promote the progress of hospital management, it is necessary to speed up the management of intelligent retrieval technology of user data in medical information system under the background of large data. The intelligent management level of each unit in the hospital to some extent determines the process of the hospital in the process of intelligent management, see Table 1.

**Table 1.** Different data differences of the medical information system users.

	Hive	RDBMU
Query language	Hive sql	Soj
Memory	HDFS	Raw device or local file system
Carry out	Mape reduce	Executor
Delayed	High	Low
Data size	Large	Small
Expand	Fine	Poor
Fault-tolerant	Yes	No

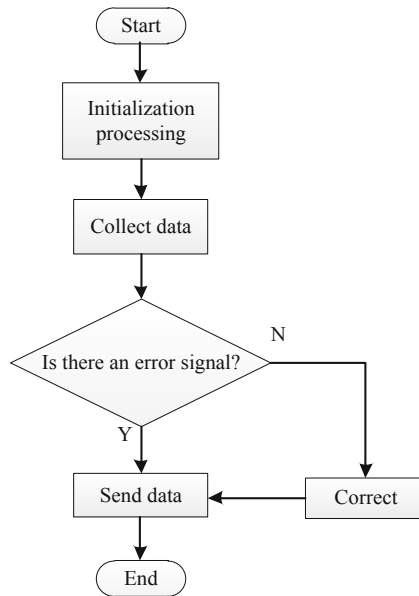
Among them, Hive sql and Soj are two different query languages. The user data information of the medical information system embodies the aggregated information data of the various departments of the hospital, and is the main information node and source of the hospital medical information network. In all the information system user data of the hospital, the data storage has reached the maximum, the source of information is complex, the use frequency is high, the quality is high, and the use characteristic of [2] constantly growing is presented. Under the background of large data, the intelligent retrieval technology of medical information system user data is not only one of the important indicators of the hospital intelligent management, but also an important basis for assessing and comparing the hospital management level, the ability level and the frequency of medical accidents. It is one of the important means for the hospital to carry out comprehensive information and intelligence management. To this end, this paper studies the medical system user data retrieval technology in the context of big data, so as to solve the problem of low data retrieval efficiency and poor recognition accuracy.

## 2 User Data Intelligent Retrieval Technology

### 2.1 Key Information Technology of Medical Record Management

The main feature of user data management in medical information system is to store the user’s medical data for future use in the hospital. At the beginning of the research and

development, the intelligent retrieval technology of the medical information system user data strictly follows the standard system of medical engineering. The data content is consistent, the data storage is comprehensive, the coding sequence is consistent, the processing means are varied and the operation is convenient, so that it [3] will be easy to be updated in the future. The intelligent retrieval technology of user information in medical information system adopts the open use and operation of users. From the very beginning, attention should be paid to the user's needs, so as to improve the use of technology cycle, so as to enhance the practical and effective use of technology, and further improve the efficiency of medical records management, input speed and accuracy of statistical data and other details, as shown in Fig. 1.



**Fig. 1.** The workflow of user data management in medical information system

The technology adopts the information source that is unified with the hospital network facilities, so as to complete the maximum compatibility of data collection, and contact the use of [4] hospital patient information management (Fig. 2).

The data management and retrieval work of the medical information system is a relatively standard and strict industry, which has standard requirements for the daily operation requirements, such as input, storage and classification of medical records. This requires that the process design of user information management information technology for medical information system developed in China is in line with the relevant regulations of the state. The database design meets the specific requirements issued by the Ministry of Health, and the design ideas and coding standards are consistent with the platform center of the hospital information management and retrieval system [5].

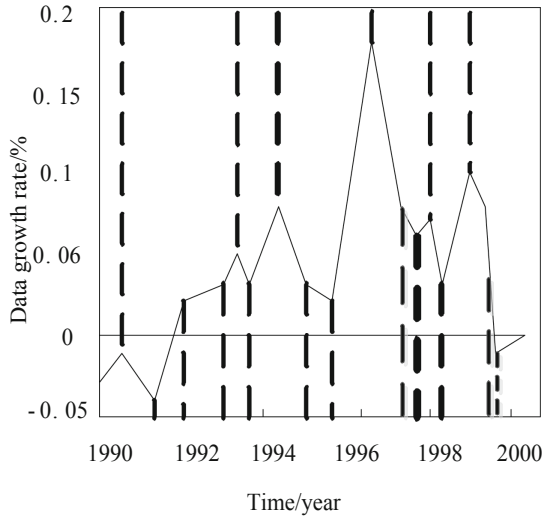


Fig. 2. Changes in data growth rate in the related year of medical system

### 2.2 Visualization Technology of Medical Information Retrieval

The application of visualization technology in medical diagnosis and treatment is still relatively broad, specific examples are “Visual Information Management Plan” [6]. It is a new integrated data management technology that emerged in the early twenty-first Century. It combines digital image technology, computer graphics, multimedia information technology, sensor sensing technology and other branch of computer simulation [7]. Through multi-dimensional reconstruction simulation technology, it can create a multi-dimensional body structure model, more intuitively and vividly to provide an effective learning approach for human body structure, making the teaching of anatomical application effective, scientific and natural interactive requirements. It has a very high application in medical research and education, diagnosis and treatment plan [8]. Assuming that the data class index is  $N$ , at the same time, each data category has its standard platform eigenvector,  $Z_1, Z_2, Z_3, Z_4, Z_5 \dots Z_m$ , therefore, the relationship between the vector  $X$  and  $W_i$ , the platform vector  $Z_i$  of the intelligent retrieval of user data in the unknown type of medical system is:

$$M(X) = m(X - Z) = \sqrt{(X - W)}(X - Z) \tag{1}$$

Where  $i = 2, 4, \dots N$ .

For example, there are three medical user information data platforms to be identified, namely, Hadoop, Spark and Storm. After many tests, the following results are obtained and analyzed. As shown in Table 2, there are three medical user, there are three types of processing characteristics of the target platform itself.

**Table 2.** Target platform processing type characteristics.

Terrace	Big data processing type
Hadoop	Off-line processing
Spark	Off-line, rapid processing
Storm	On-line, real-time processing

For any of these platforms, five distinct characteristic values  $M\{M_1, M_2, M_3, M_4, M_5\}$ . can be obtained. Then the function formula is:

$$\beta(M) = \sqrt[3]{D(M - n)} \tag{2}$$

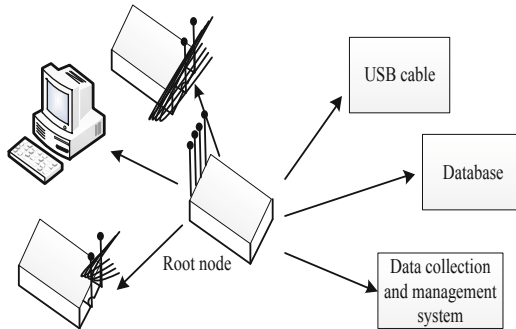
Based on this formula, the function expressions are as follows:

$$u(m - n) = (M)d - u(M - n) = \sum_3 R - m \tag{3}$$

### 2.3 SoA Oriented Service Architecture Technology

SoA is a new technology and new idea, which is designed to solve the use of medical system in recent years. It is a kind of service architecture technology [9], which has both coarseness and comfortableness. SoA can be used in existing or newly added data applications that will not worry the patient because of the long waiting time. It will upgrade the user’s data messages, as shown in Figs. 3 and 4.

In view of the particularity of the medical profession and the diversified needs of patients, more and more humanized requirements have been put forward for the collection, retrieval and analysis of medical diagnostic information. The development of medical information into visualization and intelligence provides an effective way for users to obtain the required information intuitively and conveniently [10].



**Fig. 3.** Classification structure of medical system

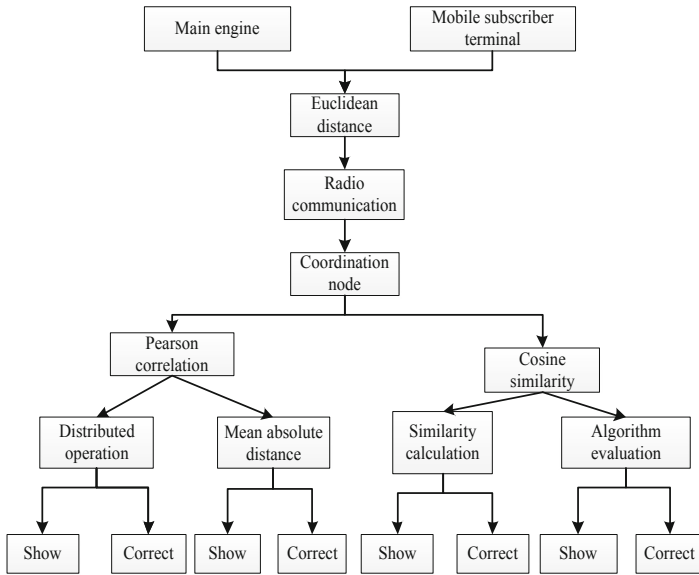


Fig. 4. SOA oriented service architecture

### 3 Experimental Results and Analysis

In order to ensure the effectiveness of the research on the intelligent data retrieval technology of medical information system in the context of big data, this experiment is carried out. Under the background of big data, the user information intelligent retrieval technology experiment of medical information system selected two different types of target data. In the experiment, the experimental targets are placed under the same network conditions to observe the retrieval speed and correct rate under different technical conditions, and record the data at any time. The schematic diagrams of the experimental demonstration results are shown in Fig. 5, respectively.

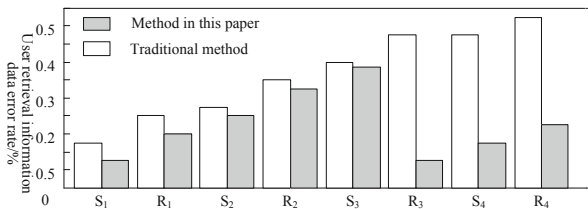


Fig. 5. Comparison of the correct rate of the target object

Through the analysis and research of this paper, we can know that the research on user information intelligent retrieval technology of medical information system under the background of big data has great significance. Although, in recent years, the

medical data system user data intelligent retrieval technology in the context of big data has made great progress, there are still many inconveniences needing for scholars to study. To this end, we must go forward, not afraid of hardships and difficulties, constantly improve the level of intelligent data retrieval technology for medical information systems in the context of big data, and obtain effective data information, so as to provide better services for China's medical industry.

## 4 Conclusions

This paper mainly studies the intelligent data retrieval technology of medical information system in the context of big data. This technology can obtain effective information in the medical system in the context of big data, accurately retrieve user data, and identify more accurately. In this way, it can help us learn more valuable patient information and improve valuable data technology resources for us to use and strengthen hospital medical systems.

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