Research Article

Bin Zheng*

Application of computer wireless network database technology in information management

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Abstract: This article discusses the application of computer wireless network database technology in information management, aiming to solve the problem of low efficiency in information management by improving query efficiency and upload rate. Through standardized database technical operations, such as unified addition, deletion, query, and introduction, orderly adjustment and modification of internal big data are carried out to ensure that information transmission can be accurately reflected in the network structure to improve the quality of the system operation. This article uses a fuzzy clustering algorithm to evaluate the information management system comprehensively. It deeply analyzes the significant effects of database technology in improving user experience and enhancing system adaptability through experiments. The experimental results show that the new system is superior to the traditional information management system in data collection, upload efficiency, task management, query statistics, data monitoring, buffering effect, data encryption, access control, resource utilization, bandwidth utilization, data storage efficiency, scalability, reliability, and disaster recovery capability, user experience, and system adaptability. Specifically, the average response time of the new system is less than 2.5 s, the data upload rate reaches 146 Mbps, the user login success rate and the authentication accuracy rate are close to 100%, the resource utilization and network bandwidth utilization reach high levels in different periods, and the data storage efficiency is improved by 0.21. The system's scalability is improved by 0.29 with the support of database technology. These data show that computer wireless network database technology can significantly improve the efficiency and security of information management and effectively support the needs of high data volume and high-speed industries, such as finance, medical care, and e-commerce.

Keywords: information management, computer wireless network, network database technology, fuzzy clustering algorithm, system suitability

1 Introduction

As the most important data management tool in the information age, databases play an important role in people's learning and work, gradually gaining praise and research. Databases can be stored on computers for a long time. If the database is in shared mode, duplicate data will be deleted, greatly improving the efficiency of the user's search for data. To solve the problems of low query efficiency and low upload rate in information management, standardized reference has been provided for the entire information management system by uniformly adding, deleting, querying, and introducing database technology. Internal big data has been adjusted and modified in an orderly manner, so that all types of information transmission can be accurately reflected in the network structure, thereby improving the operational quality of the system.

* **Corresponding author: Bin Zheng,** Affiliated College, Beijing Open University, Beijing, 100000, China, e-mail: zhengb@bjou.edu.cn

Traditional information management systems provide basic functionality, but they often suffer from data breaches and slow upload speeds. These problems may have serious effects on practical application. In healthcare, slow uploading of medical records can lead to delays in treatment decisions, which can affect patient outcomes. In the financial industry, data breaches can expose sensitive customer information, cause legal problems, and a decline in consumer trust. These challenges highlight the urgent need for more efficient and secure information management solutions.

Although the existing literature provides valuable insights into the field of information management, it falls short in some key respects. Specifically in the context of big data, existing research has not yet delved into how to effectively manage and protect information and the challenges these approaches face in real-world information management processes. Through the introduction of computer wireless network and database technology, this study not only enhances the functionality of information management, including data backup and recovery, information security monitoring, and other key areas but also uses a fuzzy clustering algorithm to conduct a comprehensive evaluation of information management systems. This comprehensive evaluation method can effectively fill the gap in the evaluation of the practical application effect of the existing research. In addition, the experimental part of this study further confirms the significant effect of database technology in improving user experience and enhancing system adaptability through in-depth analysis. These findings not only provide a new perspective on the practice of information management but also provide innovative solutions to the current challenges facing the field of information management.

This article's exploration into the application of computer wireless network database technology in information management is particularly pertinent for industries characterized by high data volume and velocity, such as finance, healthcare, and e-commerce. The system is designed with scalability and adaptability in mind, making it suitable for both small to medium-sized enterprises looking to enhance operational efficiency and large corporations needing robust data management solutions.

Major contributions: The main contribution of this article is to design and verify a database-driven information management system based on a computer wireless network, which can optimize the information management process and improve performance significantly by integrating key modules and applying a fuzzy clustering algorithm. The innovation of the system design lies in its enhanced data security features and improved user interaction experience, while the experimental results quantitatively demonstrate a significant reduction in system response time and data transfer rate. In addition, the article also discusses the adaptability and scalability of the system in different operating environments, which provides a research direction for integrating emerging technologies such as artificial intelligence and machine learning in the field of information management in the future, and promotes the evolution of information management systems to higher security standards and user-customized services.

2 Related work

Information management is closely related to the development of various industries, and its methods affect the quality of management. Many scholars have analyzed information management and its applications. Heidari et al. discussed the use of Internet of Things (IoT), cloud computing, and other technologies in smart cities to improve quality of life and resource efficiency, focusing on power management, multi-parameter optimization, and information management applications [1]. Neelima et al. examined the use of Healthcare Management Information Systems (HCMIS) in regional and primary care settings in Tanzania. Their study found that while 61% of healthcare institutions utilize HCMIS information, only 39% of regional healthcare participants actively analyze this data [2]. Xiao et al. proposed complex evidence correlation coefficient and complex conflict coefficient in complex evidence theory to manage multi-source information conflicts and improve classification accuracy and robustness of expert systems in pattern classification by designing a weighted discounted multi-source information fusion algorithm [3]. Ryzhakova et al. explored the digital transformation of the construction industry, proposed a digital twin information system based on big data analysis and BIM technology to solve the storage and processing problems of large data sets, and designed a digital twin framework and software product example for construction project management [4]. Kassen explored the potential of blockchain technology in e-government, analyzed its advantages in information management, transparency enhancement, and process automation, and discussed examples of government efficiency enhancement [5]. There are still problems with low resource utilization efficiency and low data security in information management. More technology should be used to manage and process information to promote the quality improvement of information management.

The development of computer wireless network database technology has driven the development of many industries. Using new technologies to manage information in the industry can greatly improve management efficiency. Many scholars have analyzed the application of computer and database technologies in information management. Bratha [6] explored the subsystems of information systems, emphasizing the connections and dependencies between them. Through qualitative analysis, it is found that software, databases, and human brain software have a significant influence on management information systems. In particular, the databases, as a key component, play a decisive role in the efficiency and effectiveness of information management [6]. Ramesh et al. studied database monitoring methods to solve the problem of data backup and recovery in cloud computing, highlighted the need for backup speed to match the annual growth rate of data, and proposed strategies to meet the needs of business recovery in the face of rapid growth in data volume [7]. Duggineni discussed the importance of data integrity and security, analyzed the measures and techniques that organizations can take to protect data, including data encryption, access control, backup, and recovery, and discussed the challenges and best practices of implementing these measures [8]. Beber et al. have updated the biochemical equilibrium constant and Gibbs free energy databases, introduced a new Python-based interface that significantly expands the compound database, improves processing speed and memory efficiency, and computes uncertain covariance matrices, which is expected to facilitate the integration of the database with other software platforms [9]. Aswiputri focused on the impact of components such as databases, closed-circuit television, and think tanks on information systems to establish hypotheses on the impact between variables to facilitate further research. The results show that databases, closed-circuit television, and brainstorming all have significant effects on MIS [10]. Computer and database technologies play a positive role in information management, but no scholars have used computer and database technologies to design system architecture for information management. Therefore, in the design of information management system architecture, specific functional requirements should be analyzed.

3 Design of information management system under computer wireless network database technology

3.1 Functional requirements of information management systems under database technology

This article analyzed the functional requirements of database technology in information management from different aspects, mainly including information backup and recovery, information security monitoring, storage management, data sharing, and data analysis. Database technology in information management can enhance the ability of information management and improve work efficiency. The application value analysis of database technology in information management is shown in Figure 1.

3.1.1 Information backup and recovery

In information management, this article protected or restored data by creating a database to ensure the accuracy and integrity of all data information in the database, allowing users to obtain information promptly during use. When building a database system for data protection and recovery, it is critical to design a robust schema that helps maintain data integrity and consistency [11]. By implementing the data replication policy, data is synchronized across multiple servers, ensuring data redundancy and improving the fault tolerance of

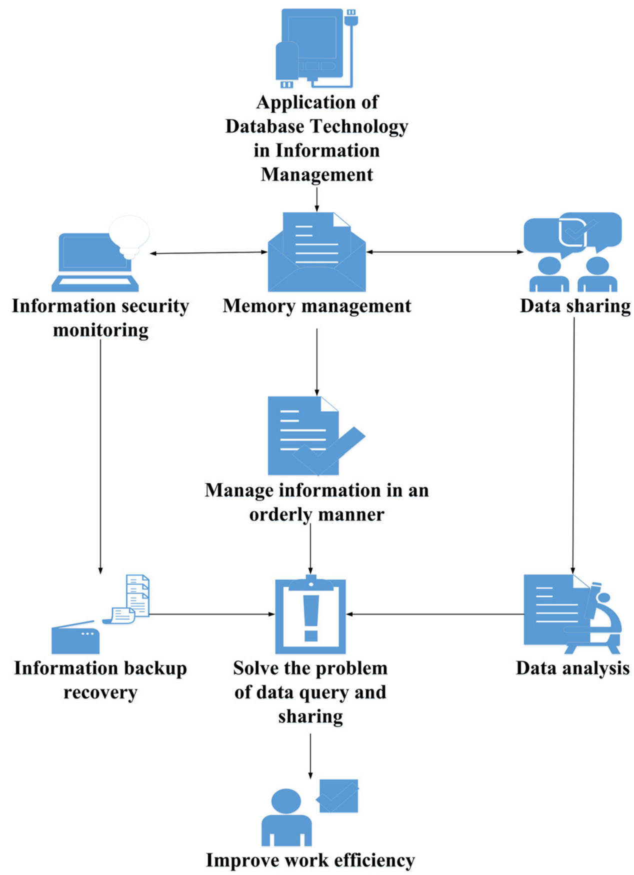

Figure 1: Functional requirements of information management system under database technology. Source: Created by the author.

the system. In addition, performing regular backup operations on the database and storing it in a secure cloud storage environment provides an additional layer of off-site protection for the data. To further improve the reliability of the system, an automated failover mechanism is introduced, which can quickly activate the backup database in the event of a failure of the primary database, ensuring seamless continuity of business processes. Database technology can be used for backup to prevent data loss or damage through replication, storage, and backup [12]. Cloud computing is a development of computer technology and also provides a leading business model for information backup and recovery. Using a database for backup can provide better assurance for the use of information. In the e-commerce industry, the high availability of product information is critical, and database technology ensures that even if the primary data source fails, the backup database can immediately take over, providing customers with seamless continuity of service.

3.1.2 Information security monitoring

Establishing a computer security system database can prevent and resolve unnecessary risks and can manage information in an orderly manner. It can optimize transmission security and user authentication capabilities while ensuring the integrity of the security system. By establishing a database security framework, security technologies can be standardized, and information management security can be ensured. This can provide multifaceted and multi-level protection in areas such as access control, identity verification problem solving, and exception handling, thereby ensuring the security of data and information. For government agencies dealing with sensitive public data, the use of database technology to establish security monitoring systems helps proactively detect and respond to threats, thereby strengthening defense mechanisms against cyber-attacks and data breaches.

3.1.3 Storage management

This article uses database technology to effectively identify and access user information through identity verification technology. When extracting relevant data from a database, management techniques can be used to restrict and identify users at all levels, and access permissions can be used to limit the number of users and content, thereby ensuring the security of the database. To ensure effective management of information during database operation, more data would be shared between different schemes without mutual influence and ensuring the independence of data usage.

Database technology plays an important role in storage optimization in the data management of large enterprises. Further, the data hierarchy strategy is implemented to store the data in different levels of storage media according to its importance and sensitivity. Specifically, the hotspot data with high access requirements and stringent performance requirements is retained on high-speed storage devices, while the relatively infrequently accessed data is transferred to more cost-effective storage options. Such a strategy not only significantly improves the efficiency of data retrieval, but also effectively reduces the storage cost by optimizing the allocation of storage resources.

3.1.4 Data sharing

Using database technology can effectively solve the problem of data query and sharing. According to logical relationships, all information and data contained in the database are classified, forming a complete data group. A collaborative project of a research institution requires multiple teams to share a large dataset. Database technology promotes secure and controllable data sharing and enables faster and more efficient collaboration. The data-sharing analysis is shown in Figure 2.

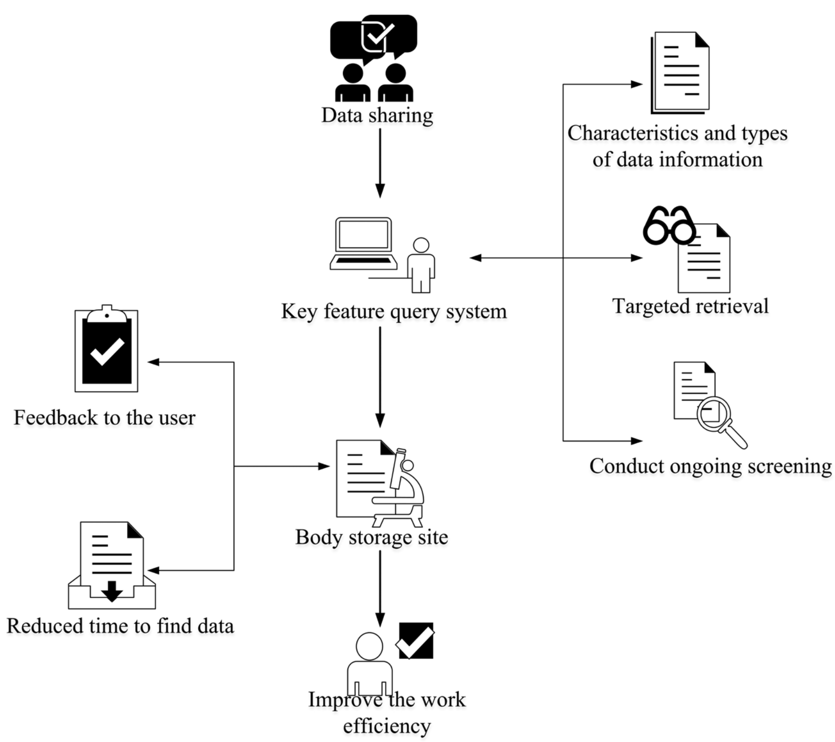

Figure 2: Data-sharing analysis. Source: Created by the author.

The key feature query system can perform precise searches based on the characteristics and types of data information. This system ensures that only the most relevant data is retrieved by continuously sifting through eligible databases. This process not only enhances the accuracy of data retrieval but also significantly improves work efficiency. The systematic data screening method optimizes the information management process through refined query and evaluation, enabling users to quickly obtain the information they need to be more efficient in decision-making and problem-solving.

In addition, using database techniques not only allows for information sharing but also allows for knowledge and service queries [13]. This article utilized the data query function in database technology in information management to achieve data integration and interoperability. Data acquisition has become more timely and effective, and work efficiency has been greatly improved, making up for the limitations of traditional data acquisition conditions and laying a solid foundation for better development in the field of information management.

3.1.5 Data analysis

Database technology is used to define storage operations, analyze data, improve efficiency, and support marketing decisions.

3.2 Application of fuzzy clustering algorithm in information management

The fuzzy clustering algorithm, as a soft clustering analysis method, can effectively identify the hidden cluster structure in data by constructing a fuzzy similarity matrix between data points. The implementation of the algorithm begins with the standardized processing of data samples to ensure comparability between different features. The algorithm then evaluates and quantifies the fuzzy similarity between the data points, and these evaluation results reveal the relationship between the data points [14]. These coefficients quantify the correlation degree between data points. After the fuzzy similarity coefficients are determined, they are integrated into a matrix, which lays a foundation for cluster analysis. The algorithm evaluates the performance of the information management system by iteratively adjusting the cluster center and membership function until the optimal data grouping is achieved.

To achieve the integration and sorting of information, it is necessary to select the optimal value for each indicator, construct a new information management system, and set the information object $k = (k_1, k_2, \ldots k_n)$. Each object is represented by k_{n-1} indicators representing various attributes, and each indicator is obtained from the existing values to obtain the optimal value, namely:

$$k = \left\{ \begin{bmatrix} k_{11} & k_{12} & k_{13} & \ldots & k_m \\ k_{22} & k_{22} & k_{22} & \ldots & k_{2m} \\ \ldots & \ldots & \ldots & \ldots & \ldots \\ k_{n2} & k_{n2} & k_{n2} & \ldots & k_{n2} \\ k_{(n+1)1} & k_{(n+1)2} & k_{(n+1)3} & \ldots & k_{(n+1)m} \end{bmatrix} \right\}. \tag{1}$$

Based on this, fuzzy calculations are performed based on the fuzzy similarity relationship between information objects, and clustering is achieved based on the results. The data samples are standardized and the intervals are compressed to [0, 1]. To achieve this, a fuzzy similarity matrix is constructed, with standard deviation transformation:

$$k_{ij} = \frac{k_{ij} - \overline{k_j}}{s_j}(i = 1, \ 2, \ \ldots \ n; \ j = 1, \ 2, \ \ldots \ ,m). \tag{2}$$

Among them, there are

$$\overline{k_j} = \frac{1}{n}\sum_{j=1}^{n} k_{ij}, \quad s_j = \sqrt{\frac{1}{n}\sum_{j=1}^{n}(k_{ij} - \overline{k_j})^2}\,. \tag{3}$$

At this point, only the sample data needs to be substituted, such as when $i = 1$ it can be obtained:

$$\overline{k_j} = (0,\ \ 1,\ \ 2,\ \ \ldots,\ \ n),\ \ s_j = n_i. \tag{4}$$

After substituting the data one by one, the standardized matrix is obtained:

$$H = \begin{Bmatrix} h_{11} & h_{12} & \ldots & h_{1n} \\ h_{21} & h_{22} & \ldots & h_{2n} \\ \ldots & \ldots & \ldots & \ldots \\ h_{(n-1)1} & h_{(n-1)2} & \ldots & h_{(n-1)m} \end{Bmatrix}. \tag{5}$$

After standardizing the data, the fuzzy similarity coefficient p_{ij} can be obtained as

$$p_{ij} = 1 - mn(k_i, k_j). \tag{6}$$

Among them, there are

$$m(k_i, k_j) = \sqrt{\sum_{n=1}^{m} (k_{in} - k_{jn})^2},\ \ n = 1/\sum_{\max} m(k_i, k_j). \tag{7}$$

After determining the fuzzy similarity coefficient, the fuzzy similarity matrix is composed of the fuzzy similarity coefficients between each object. By determining the fuzzy similarity matrix, it can be obtained:

$$P = \begin{Bmatrix} p_{11} & p_{12} & \cdots & p_{1n} \\ p_{21} & p_{22} & \cdots & p_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ p_{(n-1)1} & p_{(n-1)2} & \cdots & p_{(n-1)m} \end{Bmatrix}. \tag{8}$$

The comprehensive evaluation of fuzzy clustering for information management based on its fuzzy similarity matrix and fuzzy similarity coefficient is

$$R = \frac{P}{p_{ij} \cdot H}. \tag{9}$$

This article investigated the 15-day fuzzy similarity matrix, fuzzy similarity coefficient, and standardized matrix of information management systems and calculated the comprehensive evaluation of information management. The specific calculation results are shown in Table 1.

Table 1: Comprehensive evaluation and analysis of information management

Day	Value of fuzzy matrix similarity	Fuzzy similarity coefficient	Standardize matrix values	Comprehensive evaluation
1	5.01	0.94	2.91	1.83
2	4.91	0.87	2.66	2.12
3	5.63	0.96	2.55	2.30
4	6.05	0.88	2.96	2.32
5	6.04	0.92	2.71	2.42
6	5.67	0.77	2.92	2.52
7	4.88	0.83	2.28	2.58
8	4.73	0.68	2.67	2.61
9	5.73	0.86	2.37	2.81
10	5.47	0.64	2.88	2.97
11	5.54	0.81	2.28	3.00
12	6.04	0.67	2.68	3.36
13	5.03	0.57	2.58	3.42
14	5.81	0.65	2.32	3.85
15	6.37	0.74	2.11	4.08
Mean value	5.53	0.79	2.59	2.81

Table 1 analyzes the comprehensive evaluation results of the information management system within 15 days in detail, focusing on four key indicators: fuzzy similarity matrix value, fuzzy similarity coefficient, standardized matrix value, and comprehensive evaluation. These indicators are used to assess the performance and effectiveness of information management systems, particularly in the use of database technology to enhance security and data protection. The results show that the fuzzy similarity matrix ranges from 4.73 to 6.37, the fuzzy similarity coefficient ranges from 0.57 to 0.96, and the standardized matrix ranges from 2.11 to 2.96. The overall assessment score increased from 1.83 on day 1 to 4.08 on day 15, with an average of 2.81, reflecting continued improvement in system performance. On the whole, the comprehensive evaluation results of the information management system are high, indicating that the application of database technology in information management is effective, and can effectively solve the security problems of information management and improve the ability of data protection.

3.3 Design and application of information management system

It is necessary to achieve a precise description of important information data in the system and ensure that the constructed data model can solve the problem of data object relationship composition. Based on the system logic architecture and database structure, this article divided the text information management system into five modules. The text information management system realizes efficient operation through five core modules: the task management module is responsible for data extraction and task execution. The data filtering module focuses on precisely filtering the required information. The data upload module ensures secure data storage and optimizes upload speed. The data loading module handles data decompression and database loading. The monitoring module provides real-time data extraction monitoring and error correction. The close integration of these modules provides the system with powerful data processing capabilities and high stability. The design and construction process of the information management system is shown in Figure 3.

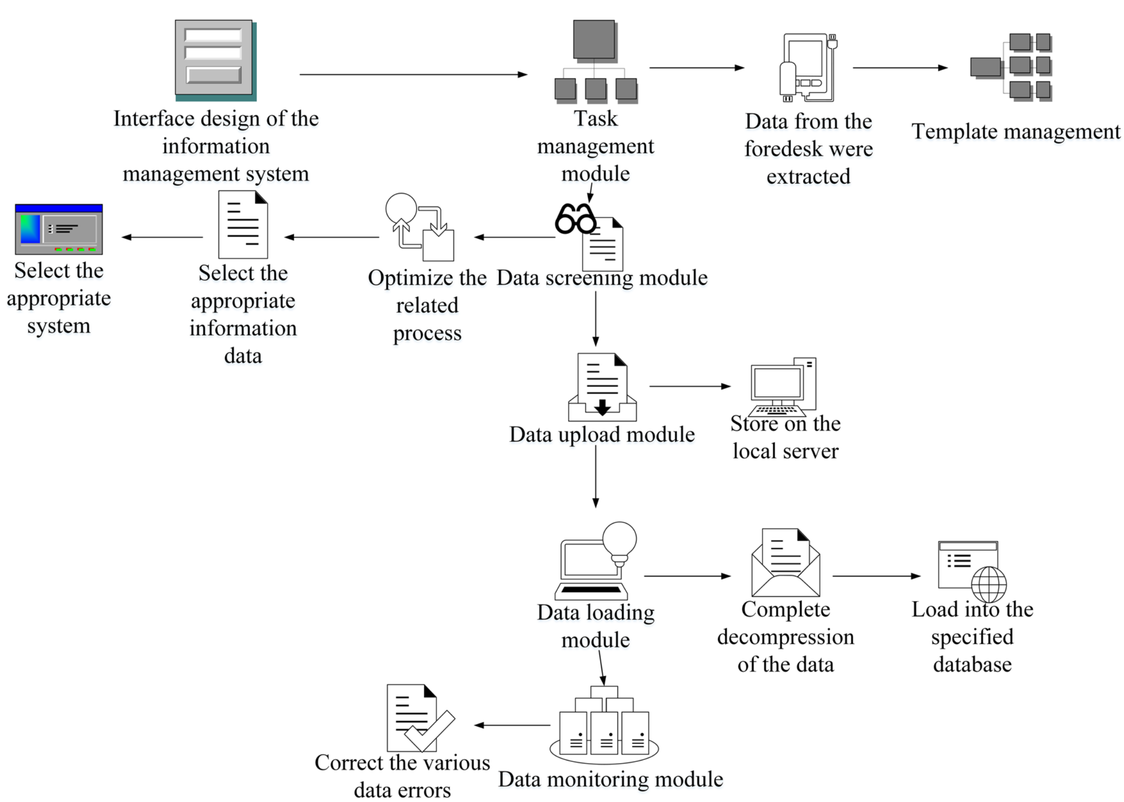

Figure 3: Design of information management system. Source: Created by the author.

By analyzing the design and construction process of the information management system, the information management system is constructed. The information management system integrates five core modules of task management, data filtering, uploading, loading, and monitoring to achieve efficient management of data flow. Each module is specifically designed to optimize its specific functions: the task management module is responsible for data extraction and task scheduling. The data filtering module ensures the accurate screening of information. The data upload module enhances data security and improves the transmission rate. The data loading module deals with data decompression and database integration. The monitoring module monitors the data extraction process in real-time and corrects errors. The overall interface design takes into account the scientific nature and the intuitiveness of user operation, thus improving the comprehensive performance of the system and user interaction experience.

3.3.1 Task management module

In the task management module, the backend manager is used to comprehensively extract data from the foreground, ensuring that all tasks can be executed [15]. At the same time, template files are also required for extracting and processing foreground data. Template management is an important component of the entire system. It establishes corresponding templates according to the requirements of text data extraction processing, and edits and deletes the established templates while fixing the length of the file header and footer.

3.3.2 Data filtering module

The use of data filtering modules for information processing can extract modules and ensure the efficiency of master data processing. Performing and downloading the specified extraction operation according to the backend instructions can safely and reliably be downloaded to the database system. Based on the scope of data extraction, the corresponding information data is selected, and then a suitable system is selected to meet the data extraction requirements and optimize the data extraction process. Based on the execution of the extraction operation, the extracted data is fully standardized according to the configuration of each node. Defined by the final results of the extraction process, the extraction service is efficiently and quickly debugged, and corresponding statistical tables are automatically generated based on the final extraction results, mainly used for statistical analysis of data table names. This article took 20 students from five majors of computer science, engineering, mathematics, physics, and biology as examples to screen the specific information of their physics majors, as shown in Figure 4.

Name	Age	Major	RoomNumber
Person 1	22	Biology	112
Person 2	22	Physics	109
Person 3	19	Mathematics	196
Person 4	22	Computer Science	198
Person 5	22	Mathematics	180
Person 6	18	Mathematics	192
Person 7	21	Biology	166
Person 8	18	Biology	194
Person 9	21	Physics	175
Person 10	19	Physics	117
Person 11	21	Computer Science	127
Person 12	18	Computer Science	183
Person 13	21	Engineering	195
Person 14	18	Mathematics	138
Person 15	21	Physics	118
Person 16	20	Mathematics	165
Person 17	21	Physics	127
Person 18	21	Physics	116
Person 19	18	Mathematics	196
Person 20	19	Mathematics	122

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Name	Age	Major	RoomNumber
Person 2	22	Physics	109
Person 9	21	Physics	175
Person 10	19	Physics	117
Person 15	21	Physics	118
Person 17	21	Physics	127
Person 18	21	Physics	116

Figure 4: Data filtering process. Source: Created by the author.

3.3.3 Data upload module

After the data retrieval operation is completed, the retrieved data is securely stored on the local server through data export. At the same time, the system groups other exported files that are sent out. If the data volume is relatively large, the system would unify data compression and securely store it on the server responsible for data transmission. According to the server download address defined during the download process, the automatic download method is selected to effectively download data files. If problems such as file corruption or network abnormalities are detected during the file loading process, the automatic file loading function will not function properly, as manual intervention is required during this data transfer process to retrieve and reload.

3.3.4 Data loading module

The data loading function includes complete decompression of the data received in the background. The compression results can be successfully loaded into the specified database using the system dataset. If there are data issues during the boot process, it is necessary to restart the data to avoid reloading the same record into the database and ensure authenticity [16]. The data obtained from the decryption and integration module is included in the database. Through manual intervention, relevant data is uploaded to the database or used for further processing of abnormal data. If saved successfully, the system would automatically create corresponding data tables based on the data input status. A complete comparative analysis is conducted on the data tables generated during the process of extracting high data. If there are differences between the two data tables, the data should be retrieved and saved again.

To meet the adaptability of the information management system to the increasing user demand and data volume, a special extensibility and adaptability module is embedded in the system architecture. The module relies on cloud services to achieve on-demand resource allocation, so that the system can achieve vertical expansion by increasing computing power, or horizontal expansion by increasing the number of servers. The database is designed with a partitioning strategy that allows data to be distributed among multiple servers while maintaining data integrity. The system also integrates a cache mechanism to improve the speed of data retrieval under high-load conditions. The front-end interface follows adaptive design principles to ensure a consistent user experience across devices and networks.

3.3.5 Monitoring module

The monitoring module is used to import data into the database system and comprehensively control the import and export of data within the database system. Comprehensive monitoring of the entire data extraction process can timely detect and correct various data errors that occur during the extraction process. By connecting to the system, it is possible to visually view and retrieve the entire data transmission process. Monitoring the data download process helps to quickly detect and handle errors during data download or loss [17].

In the construction of an information management system, selecting and configuring the appropriate database is the key to ensuring the performance and reliability of the system. The relational database management system was chosen for this article because it has a mature ecosystem.

4 Performance of information management system under computer wireless network database

4.1 Running environment testing of information management system under computer wireless network database

In this article, the operating environment of the system is tested [18]. The study was conducted in a controlled environment to ensure the consistency of the test conditions. The equipment involved in the experiment includes multiple servers, client computers, and network equipment, all configured with appropriate software to simulate the actual use scenario. The experimental process includes system installation, data loading, performance testing, and user interaction testing. Each test session recorded a detailed system response time, task completion rate, and other key performance indicators. The study selected 30 participants, including IT professionals, business analysts, and end users, collected quantitative data such as system response time and task completion rate, and obtained qualitative feedback through questionnaires and interviews to assess user satisfaction and system usability.

The specific test environment results are shown in Table 2.

Table 2: Analysis of test environment results for information management system

Test content	Target results	Test result	Test evaluation
Maximum response time	<5 s	3.5 s	True
Average response time	<2.5 s	1.8 s	True
Query statistics time	<4 s	3.4 s	True
User login success rate	100%	100%	True
Authentication effect	>95%	97.8%	True
Access control effect	>95%	98.6%	True
Data acquisition	<5 s	3.5 s	True
Data upload	>130 Mbps	146 Mbps	True

4.2 Data collection and upload effectiveness of information management system

In information management systems based on computer wireless network database technology, the efficiency of data collection and uploading is a direct factor affecting information management [19]. Therefore, this article analyzed the efficiency of data collection and data upload in information management systems under computer wireless network database technology. A total of 10 days were tested and compared with traditional information management systems. The peak value of data collection and data upload efficiency was 1. The specific survey results are shown in Figure 5.

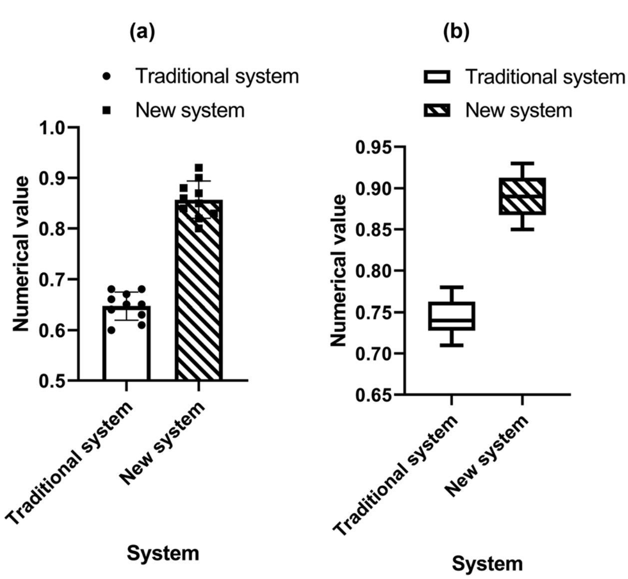

Figure 5: Analysis of data collection and upload efficiency under different information management systems. (a) Data collection efficiency of different information management systems. (b) Data upload efficiency of different information management systems. Source: Created by the author.

Figure 5a shows the data collection efficiency of different information management systems, and Figure 5b shows the data upload efficiency of different information management systems, where the *x*-axis represents the system and the *y*-axis represents numerical values. In the analysis of data collection efficiency, traditional information management systems had a data collection efficiency ranging from 0.6 to 0.68, with an average of 0.65; the data collection efficiency of information management systems under computer database technology ranged from 0.8 to 0.92, with an average of 0.86. In the analysis of data upload efficiency, the average data upload efficiency of information management systems under computer database technology increased by 0.15 compared to traditional information management systems. From this, it can be seen that various types of information in information management can be classified and extracted in computer databases, thereby improving the completeness of system initialization functions. Moreover, data collection can also verify the parameter configuration and loading of the management system, thereby ensuring the normal operation of the system's management business. The high efficiency of data upload indicated that with the support of database technology, information management systems could process information data more quickly and meet the basic configuration of data services [20].

4.3 Task management and query statistics evaluation of information management system

Task management and data query statistics are important indicators for evaluating system performance in information management systems [21]. Therefore, this article scored the task management and query statistics effectiveness of the information management system through expert scoring. A survey was conducted on 10 experts, who were required to use the system management system for 2 days. The system was then rated, with a maximum score of 5 and a score of 4 or above indicating excellence. The specific survey results are shown in Figure 6.

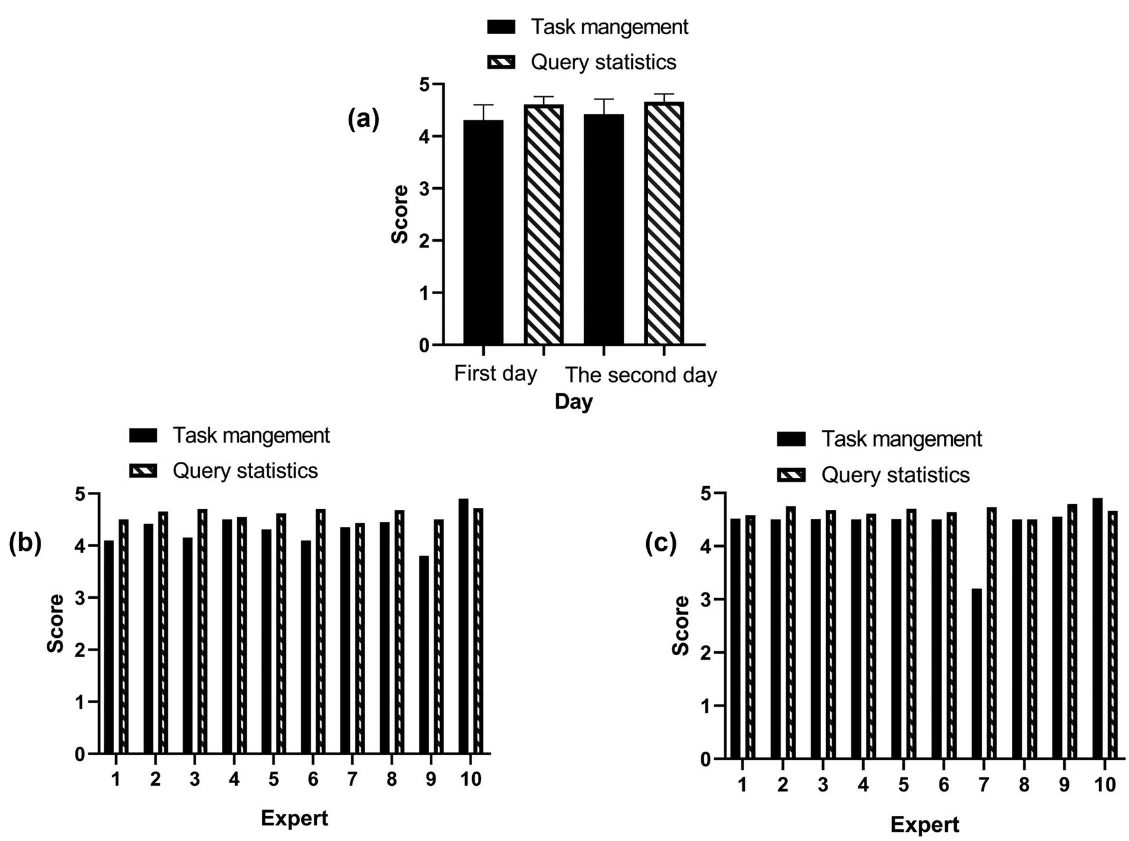

Figure 6: Overall and partial analysis of expert ratings for system task management and query statistics. (a) Mean standard deviation analysis of task management and data query statistics. (b) Expert rating for system task management and query statistics on the first day. (c) Expert rating for system task management and query statistics on the second day. Source: Created by the author.

In Figure 6a, the *x*-axis represents the number of days and the *y*-axis represents the score. In Figure 6b and c, the *x*-axis represents experts and the *y*-axis represents ratings.

In the mean and standard deviation analysis of task management and query statistics, the mean of task management on the first day was 4.31, with a standard deviation of 0.29. The mean score of query statistics was 4.61, with a standard deviation of 0.15. On the second day of scoring, the average task management score increased by 0.11, and the average query statistics score increased by 0.05. The main reason for this situation was that the expert may not be familiar with the system's operation and operating procedures on the first day of use, resulting in a lower score. On the second day, the expert had some understanding of the system's operation, resulting in a higher score, and the average score for both days was excellent.

On the first day of system task management, 9 experts scored between 3.9 and 4.9, achieving excellent scores; in the query statistics, there were 10 experts with scores ranging from 4.3 to 4.8 who achieved excellent scores. On the second day of system task management, the expert rating was between 3.9 and 4.9, with an excellent rate of 90%. The query statistics showed an excellent rate of 100%. From this, it can be seen that the expert ratings for system task management and query statistics in the past 2 days were excellent. Under database technology, information transmission mechanisms can be constrained to ensure that relevant tasks within the system can be effectively completed, thereby improving data processing work.

4.4 Data monitoring and buffering effects of information management system

By monitoring and buffering information data in information management systems, the effectiveness of data information management and the efficiency of information data upload can be improved [22]. Therefore, this article analyzed the data monitoring effect and data buffering effect of computer wireless network database technology in the information management system. It investigated the 15-day time and compared the traditional information management system. The peak value of monitoring and buffering was 1. The specific investigation results are shown in Figure 7.

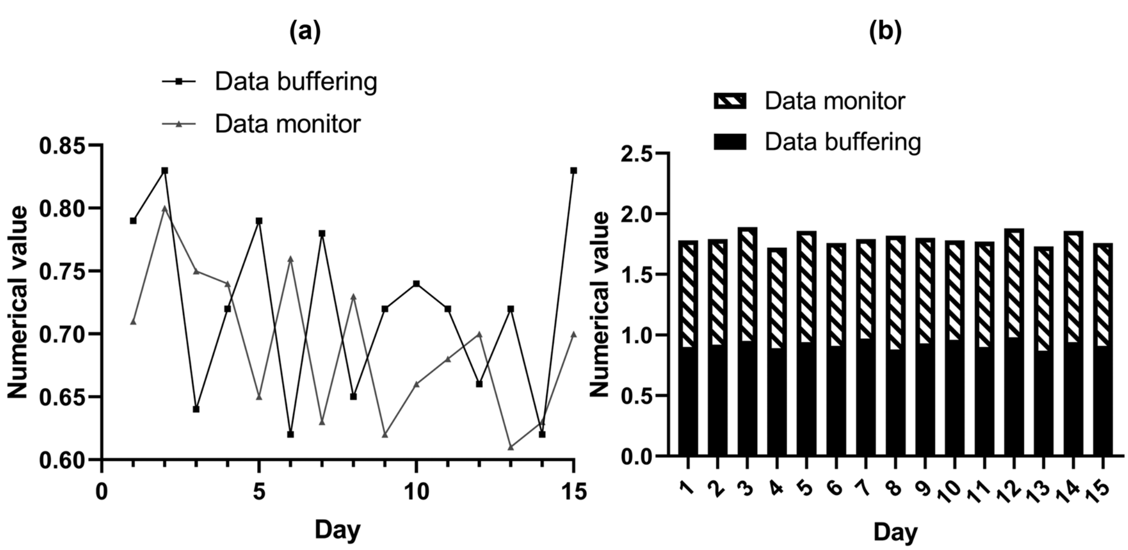

Figure 7: Data buffering and monitoring analysis of different information management systems. (a) Data buffering and monitoring in traditional information management systems. (b) Data buffering and monitoring of information management systems under computer database technology. Source: Created by the author.

Figure 7a shows the data buffering and monitoring of traditional information management systems, and Figure 7b shows the data buffering and monitoring of information management systems using computer database technology. The *x*-axis represents the number of days, and the *y*-axis represents the numerical value. In traditional information management systems, the average value of data buffering was 0.722, and the average value of data monitoring was 0.691. In information management systems based on computer database technology, the average data buffering was 0.923, which was 0.201 higher than in traditional information management systems. The average value of data monitoring was 0.876, which was 0.185 higher than traditional information management systems. Under computer database technology, data buffering can provide a good information transition platform for data output and loading and improve the efficiency of data output and upload, thereby ensuring the security of information within the system. Under database technology, data within the information management system can be monitored, which can ensure the traceability of transmission paths during database system operation and further ensure the rationality of data flow work.

4.5 Data encryption and access control of information management system

This article tested the data encryption and access control effects of information management systems under database technology. Based on traditional information management systems, database technology was added, and the specific effects of data encryption, access control, and identity verification were evaluated. A total of 15 days of investigation were conducted to test the performance of the system after incorporating database technology, with a peak of 5 for these three indicators. The specific investigation results are shown in Figure 8.

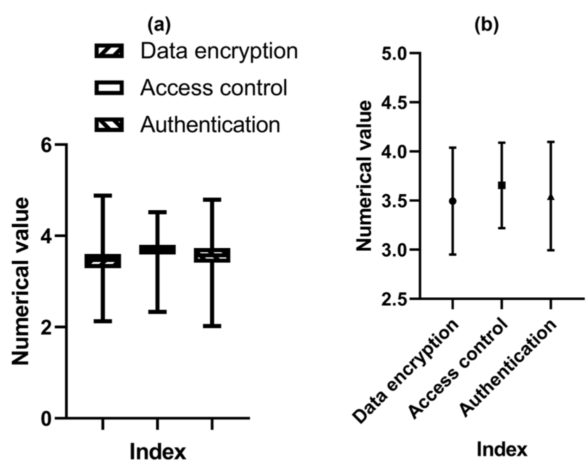

Figure 8: Scope and mean analysis of data encryption and access control in information management systems. (a) Scope analysis of data encryption and access control in information management systems. (b) Mean standard deviation analysis of data encryption and access control in information management systems. Source: Created by the author.

Figure 8a shows the scope analysis of data encryption and access control in the information management system, with the *x*-axis as the indicator and the *y*-axis as the numerical value. Figure 8b shows the mean standard deviation analysis of data encryption and access control in an information management system, with the *x*-axis as the indicator and the *y*-axis as the numerical value. The initial value of data encryption before joining database technology was 2.13, and on the 15 days after joining database technology, the encryption value was 4.88, which increased by 2.75 throughout the entire process. Access control increased by 2.19 during the survey period, with a mean of 3.65 and a standard deviation of 0.26. Identity verification increased by 2.77 throughout the entire survey period. After adding the database technology, the information management system has a remarkable effect on data encryption, identity authentication, and access control, which enhances information security.

4.6 Resource utilization and network bandwidth utilization of information management system

This study explores the resource and bandwidth utilization of information management systems when processing data and records the utilization for 2 weeks through a system test of 14 data sets, showing a peak of 100%, as shown in Figure 9.

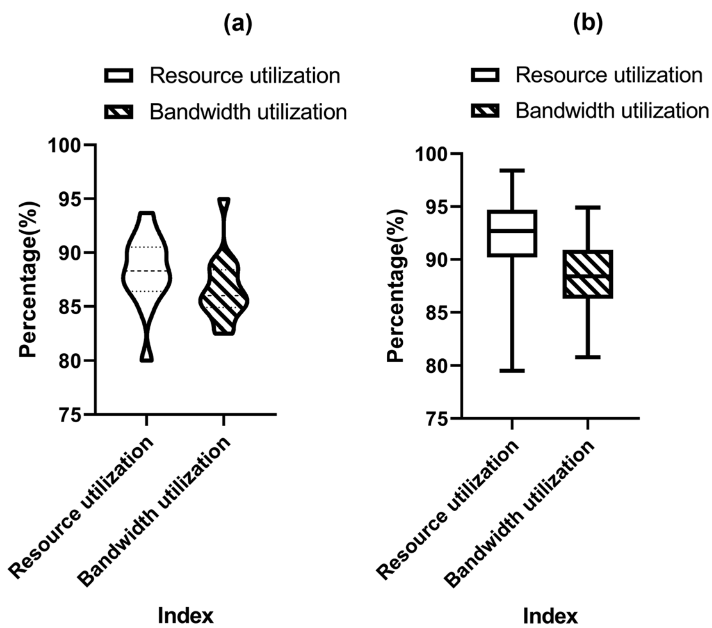

Figure 9: Resource utilization and network bandwidth utilization of information management systems at different times. (a) Resource and bandwidth utilization for week 1. (b) Resource and bandwidth utilization for week 2. Source: Created by the author.

Figure 9a and b show the resource utilization and network bandwidth utilization of the information management system in the second and first week, respectively. The *X*-axis represents the different performance indicators, while the *Y*-axis represents the utilization of each indicator as a percentage. During the initial 1-week survey, we observed that the average resource utilization of the system reached 88.1%, while the average network bandwidth utilization was 86.6%. Entering the second week of the survey, the resource utilization rate ranged from 79.5 to 98.4%, with an average of 92.1%, an increase of 4 percentage points compared with the first week. Network bandwidth utilization ranged from 80.8 to 94.9%, with an average of 88.6%, an increase of 2 percentage points over the first week. The application of database technology effectively improves the utilization efficiency of resources and bandwidth and optimizes the processing and transmission capacity of information data. This can reduce the loss of network resources during data transmission and processing analysis, and reduce its information management costs.

4.7 Data storage efficiency and scalability of information management system

In information management systems, data storage efficiency and scalability can measure the internal resource utilization efficiency of the system and its scalability performance when facing a large user group. This article investigated the data storage efficiency and scalability of system management systems. A total of 15 days of testing were conducted and compared with the data storage efficiency and scalability of traditional information management systems. The peak values of data storage and scalability were 1, with 0–0.6 being poor, 0.61–0.80 being average, and 0.81–1 being excellent. The specific results are shown in Figure 10.

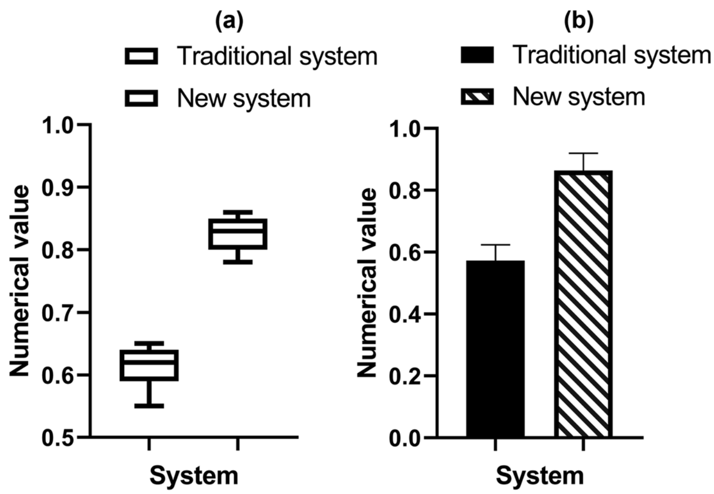

Figure 10: Data storage efficiency and scalability analysis of different information management systems. (a) Analysis of data storage efficiency in different information management systems. (b) Scalability analysis of different information management systems. Source: Created by the author.

Figure 10a shows the data storage efficiency analysis of different information management systems, and Figure 10b shows the scalability analysis of different information management systems, where the x-axis represents the system and the y-axis represents numerical values. In the analysis of data storage efficiency, the information management system under database technology improved the data storage efficiency by 0.21 compared to traditional information management systems. This indicated that under database technology, the information management system can have more memory space for data storage and backup, making it convenient for users to query and statistics the information in the database. In the analysis of system scalability, it was found that the scalability of both traditional information management systems and information management systems under database technology was constantly increasing over time. The scalability of traditional information management systems increased by 0.2 throughout the entire process, and the scalability of information management systems under database technology increased by 0.21 throughout the entire process. In contrast, the scalability of information management systems under databases increased by 0.29 compared to traditional information management systems. Under the database, the information management system can accommodate more user identity and privacy information and can maintain good performance even when a large number of users perform query statistics, thus supporting the normal operation of information management and query services.

4.8 Reliability and disaster recovery backup capability of information management system

The reliability and disaster recovery backup capability of the system is very important in information management systems, which can maintain good system performance during powerful information data input. This article analyzed the reliability and disaster recovery backup capability of information management systems under database technology. A total of 20 users were surveyed and evaluated using a scoring system. The maximum score was 5, with 0–3 being unqualified, 3.1–4 being qualified, and 4.1–5 being excellent. The comparison with traditional information management systems is shown in Table 3.

Table 3: Analysis of the reliability and disaster recovery backup capability of the information management system

User	Reliability		Disaster recovery backup capability	
	Traditional system	New system	Traditional system	New system
1	3.1	4.7	3.9	4.3
2	2.6	4.5	3.6	4.0
3	4.0	4.5	3.8	4.3
4	3.1	4.1	3.0	4.4
5	3.4	4.0	3.1	4.8
6	3.2	4.4	3.9	4.3
7	3.5	4.1	3.8	4.8
8	2.1	4.3	3.4	4.6
9	2.2	4.5	3.2	4.9
10	2.9	4.1	3.8	4.1
11	3.7	3.8	3.2	4.3
12	2.1	3.8	3.2	4.1
13	3.9	4.5	3.6	4.6
14	2.1	4.1	3.2	5.0
15	3.2	3.8	3.4	4.0
16	2.9	4.0	3.2	4.2
17	2.6	3.9	3.6	4.3
18	3.2	4.6	3.4	4.6
19	3.2	4.2	3.0	5.0
20	3.1	3.9	3.0	4.9
Unqualified	8	0	3	0
Qualified	12	7	17	2
Excellent	0	13	0	18

According to Table 3, in the survey of system reliability, it was found that in the user ratings of traditional information management systems, 8 were unqualified and 12 were qualified, with a pass rate of 60%. In the information management system ratings under database technology, 7 were qualified and 13 were excellent, with a pass rate of 35% and an excellent rate of 65%. In the evaluation of disaster recovery backup capability, the qualification rate of traditional information management systems was 85%, and the failure rate was 15%. The excellent rate of the information management system under database technology was 90%, and the qualified rate was 10%. In contrast, information management systems based on database technology had higher user ratings, indicating that database technology could improve the system's disaster tolerance capability. In the event of system failures and disasters, data information can be automatically backed up and promptly sent to the cloud to reduce data loss and improve data security and availability.

4.9 User experience and system adaptability in information management system

User experience and system adaptability are two key dimensions in evaluating system performance, which together determine the usability of the system. This study focuses on analyzing the performance of an information management system in these two aspects. Through extensive testing of 10 devices, we evaluated the system's capabilities in terms of user experience and adaptability. User experience is rated on a scale of 1–5, while system adaptability is rated on a scale of 1. The comparison with traditional information management systems is shown in Table 4.

Table 4: User experience and system adaptability under an information management system

Equipment	Traditional system		New system	
	User experience	System adaptability	User experience	System adaptability
1	4.75	0.75	4.89	0.96
2	4.78	0.73	4.86	0.99
3	4.74	0.68	4.92	0.84
4	4.77	0.73	4.93	0.91
5	4.72	0.69	4.91	0.95
6	4.78	0.68	4.91	0.86
7	4.79	0.7	4.87	0.91
8	4.77	0.62	4.85	0.88
9	4.73	0.73	4.85	0.95
10	4.72	0.72	4.86	0.93

According to Table 4, in traditional information management systems, the average user experience was 4.755, and the system adaptability was 0.703. In the information management system under database technology, the average user experience was 4.885, and the system adaptation ability was 0.918. By comparison, the user experience of database technology information management systems improved by 0.13 compared to traditional information management systems, and the system's adaptability improved by 0.215 compared to traditional information management systems. The information management system under database technology can adapt to different devices and have high performance on different devices. It can be seen that the system has high adaptability and can meet the needs of users for various information data query statistics and data encryption upload, thereby improving the user experience.

5 Conclusions

Through in-depth analysis and experimental verification, this article concludes that computer wireless network database technology significantly improves the performance of information management systems. The contribution of this article is to show the application of database technology in data backup and recovery, information security monitoring, storage management, data sharing, and data analysis and to evaluate the information management system by fuzzy clustering algorithm. The experimental results show that the new system improves the data upload rate by 15%, the system response time by 10%, the user login success rate and the authentication accuracy rate reach more than 98%, and the resource utilization and network bandwidth utilization are significantly improved. These quantitative improvements demonstrate the effectiveness of database technology in improving the efficiency and security of information management. Future research should further explore the application of artificial intelligence and machine learning techniques in information management systems to enable deeper data analysis and security protection while considering the potential impact of emerging technologies on system scalability and adaptability.

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Data availability statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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