

# The application of database systems in information management

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**Abstract.** Database technology has always been a focal point of interest for enterprises and organizations in the field of information management. With the continuous growth and diversification of information, effective information management has become crucial. This paper aims to explore the extensive applications of database systems in information management. Firstly, the paper reviews relational and non-relational databases. Subsequently, it delves into the current applications of database systems in various domains, including enterprise management, retail, education, and government and public services. In the realm of enterprise management, database systems provide a solid foundation for information management by ensuring the timeliness, accuracy, and reliability of data. In the retail industry, they support inventory management, sales analysis, and enhance the user experience. In education, database systems are used for student information management, teaching data analysis, and online learning. In the government and public services sector, they facilitate information sharing and data transparency, while playing a critical role in crisis management and emergency response. This paper highlights the significance and diverse applications of database systems in different domains, offering insights into the current research trends and future prospects in this field.

**Keywords:** Database, Information Management, SQL, NoSQL.

## 1. Introduction

Database technology, as one of the core technologies in the fields of information management and data processing, has found widespread applications across various domains [1-2]. With the advent of the information age, the explosive growth and diversification of data have made data management and processing increasingly complex and critical [3]. In areas such as enterprise management, retail, education, and government and public services, the application of database systems has become an indispensable part of improving efficiency, supporting decision-making, and fostering innovation. This paper aims to delve into the current applications, characteristics, and future development trends of database systems in information management, with the goal of showcasing the value and impact of database technology in different domains [4].

In the context outlined above, the primary objective of this paper is to conduct an in-depth investigation into the current applications, characteristics, and advantages of database systems in various domains. Through the analysis of specific application cases in enterprise management, retail, education, and government and public services, the author will explore how database systems meet the information

management needs of different domains, support decision-making, optimize business processes, and promote public participation and data transparency. Additionally, the author will examine optimization strategies for database systems, such as performance optimization, resource management and allocation, as well as future development trends, such as integration with cloud computing and virtualization [5]. Through the research presented in this paper, readers will gain a more comprehensive understanding of the importance and potential of database technology in information management, providing stronger support for future data management and analysis.

## 2. Database Technology and Information Management Overview

### 2.1. Relational Databases vs. Non-Relational Databases

A relational database is a data storage method based on table structures and relationships, and it plays a vital role in information management. It stores data in a tabular form, with each table containing multiple rows and columns of data records. The relationships between data are established using key values, and this structure helps maintain data consistency and integrity [6]. The core features of a relational database include:

- **Tabular Structure:** Data is organized in tabular form, with each table containing multiple columns and rows of data records. Each column represents a data attribute, while each row represents a data record.
- **Relationships:** Relationships are established between data tables through key values, enabling data from different tables to be interconnected. This relationship facilitates flexible data querying and analysis.

- **ACID Properties:** Relational databases adhere to the ACID principles, ensuring data Atomicity, Consistency, Isolation, and Durability. This guarantees the integrity and reliability of data.

When data requires strict modeling, consistency, and reliability, a relational database is a powerful tool. The advantages of a relational database include:

- **Transaction Support and Data Consistency:** Relational databases stand out with their robust transaction support and data consistency features. Transactions ensure that operations within the database either all succeed or all fail, thus maintaining data integrity. This is crucial for applications involving sensitive data like finances, transactions, and orders.

- **Flexibility in Data Modeling:** Relational databases use a tabular structure to store data, offering flexibility and structure. Rows and columns in tables can store different types of data and support the creation of complex relationships. This makes relational databases suitable for scenarios requiring multidimensional data analysis and complex queries.

- **Data Integrity and Constraints:** Relational databases allow the definition of data integrity and constraint rules to ensure data accuracy and consistency. These rules can prevent the insertion or updating of invalid data, thus enhancing data quality. This is particularly important for applications with stringent data quality requirements, such as customer information management and financial systems.

- **Standardized Query Language:** Relational databases use Structured Query Language (SQL), a standardized query language capable of executing various complex queries. This enables users to easily retrieve, filter, and analyse data, supporting data-driven decision-making.

- **Data Security and Access Control:** Relational databases provide robust data security and access control mechanisms. Administrators can assign different access permissions to users and roles, ensuring that only authorized personnel can access sensitive data. This is especially important in industries requiring strict data protection.

As data continues to grow and diversify, non-relational database technologies are playing an increasingly important role in information management. Non-relational databases, also known as NoSQL databases, come in various types based on their storage models [7], including:

- **Document Databases:** These databases store data in a semi-structured format, typically using JSON or XML documents. Each document can have varying fields, making them suitable for applications with evolving or dynamic data schemas.

- **Key-Value Stores:** Key-value stores are designed to store data as simple key-value pairs, where each piece of data is associated with a unique key. They are highly efficient for basic data retrieval and storage operations.

- **Column-Family Stores:** Column-family databases are optimized for handling large volumes of data with high write throughput. They organize data into column families or column families, where each column family can contain a different set of columns.

- **Graph Databases:** Graph databases are specialized for managing data with complex relationships, such as social networks or network topologies. They use graph structures to represent and query relationships between data entities efficiently.

Non-relational databases are renowned for their data flexibility and scalability [8]. They don't require predefined table structures, making them well-suited for storing semi-structured and unstructured data, such as log files and text documents (Table 1). Additionally, non-relational databases support dynamic data schemas through flexible models, allowing data to have different attributes in different records. Furthermore, they excel in scalability, as they employ distributed architectures, enabling horizontal scaling to accommodate growing data workloads while maintaining high performance. In the era of big data, non-relational database technologies provide solutions for storing and processing massive datasets, capable of handling vast amounts of data with high performance and low latency for real-time data processing [9]. The advantages of non-relational databases include:

- **Handling Large-Scale Data:** Non-relational databases are highly suited for processing massive datasets due to their distributed architecture and scalability. Whether it's user-generated content on social media platforms, data generated by IoT devices, or real-time analytics, non-relational databases can easily handle the storage and processing of vast amounts of data.

- **Flexible Schemas:** Non-relational databases allow data to be stored without the need for predefined schemas. This is particularly useful for applications that frequently change data structures, such as log data and sensor data. Data can be stored in formats like JSON, documents, or key-value pairs, providing flexibility for evolving data.

- **High Concurrency and Low Latency:** Non-relational databases are designed to support high concurrency and low-latency data access. This makes them excel in areas requiring immediate data updates and responses, such as real-time applications, gaming, and financial transactions.

- **Multi-Model Support:** Some non-relational databases support multiple data models, including document, graph, column-family, and more. This versatility allows them to adapt to various application scenarios. For example, graph databases are suitable for social network analysis and recommendation systems.

**Table 1.** Comparison between relational databases and non-relational databases.

Feature	Relational Database	Non-Relational Database
Data Structure	Utilizes tabular structure	Utilizes flexible structures
Data Model	Strictly defined schema	Dynamic, no fixed schema
Data Consistency	ACID transaction support	Flexible data consistency
Query Language	Structured Query Language (SQL)	Database-specific query languages
Reliability and Stability	Mature and well-established	Relatively newer, varies by database
Use Cases	Transactional applications, complex queries, and analytics	Big data, real-time data
Main Challenges	Predefined schemas, not suitable for dynamic data models	Data consistency, lack of standardized query language

## 2.2. Integration of Databases and Information Management

The integration of database technology with information management involves combining database technology with various domains or business processes to achieve efficient and intelligent data

management, storage, and analysis. This integration can be manifested at multiple levels, including data storage, data analysis, decision support, collaboration, and data sharing [10]. The fusion of database technology in information management not only strengthens data storage and processing capabilities but also provides more efficient solutions for information management.

The integration of database technology offers several advantages in the field of information management. Firstly, database systems provide efficient mechanisms for data storage and management, offering convenient ways for organizations to store, retrieve, and update various types of data. Traditional information management often involves a vast amount of data, such as customer information, sales data, inventory information, and more. Through effective data storage and indexing techniques, database systems enable organizations to easily store, retrieve, and update this data.

Secondly, database systems support complex queries and analysis operations, providing deeper insights. In information management, in-depth data analysis can reveal correlations, trends, and patterns among data. Through SQL queries, data analysis tools, and report generation, information managers can gain valuable insights from the data, helping them better understand business situations and market dynamics.

The integration of database systems in information management makes data analysis and decision support more efficient. Data analysis is a crucial means to gain in-depth insights into business situations. Through data warehousing and data mining techniques within databases, information managers can explore patterns, trends, and regularities hidden within the data. This allows organizations to more accurately assess market trends, customer demands, and business performance, leading to wiser strategic decisions.

Decision support extends beyond data analysis and includes the ability to translate data into actionable decisions. Database systems provide access to historical and real-time data, enabling information managers to make decisions based on the latest data. Through data warehousing, OLAP (Online Analytical Processing), and data visualization tools, information managers can gain a comprehensive understanding of the business situation, facilitating more forward-thinking and strategic decision-making. For example, nearly all banks nowadays use database systems to store customer financial data, loan histories, and repayment records. Through data analysis, a bank can assess the credit risk of different customers and may identify patterns associated with high-risk customers, such as prolonged delays in repayment. By identifying such patterns, the bank can refine its credit policies more accurately, reducing the risk of bad loans.

The integration of database systems also promotes data sharing and collaboration. In the past, information from different departments and teams was often stored in isolated systems, making it challenging to share and collaborate on information. By centralizing data in a single database, information managers can achieve data sharing and unified access, avoiding information silos.

The sharing capabilities of database systems strengthen cross-departmental collaboration. Different teams can access and update data in the same database, ensuring data synchronization and collaboration. This collaboration can accelerate business processes, improve overall efficiency, and ensure information consistency among different teams.

The fusion of databases and information management not only enhances data processing efficiency but also provides more in-depth data analysis and decision support capabilities. In the ever-changing landscape of information management, database technology will continue to play a critical role in helping organizations better manage and leverage data.

### **3. Application Status of Database Systems in Information Management**

#### *3.1. Database Applications in Enterprise Management*

As a cornerstone of information management, database systems ensure the secure, reliable, and efficient management of enterprise data. Through persistent data storage, they provide businesses with timely, accurate, and dependable data, whether it's about customers, products, transactions, or other critical

information. This method of data storage guarantees data consistency and traceability, providing a solid foundation for business operations and decision analysis.

*3.1.1. Meeting Information Management Needs.* The core of information management lies in meeting the requirements for data timeliness, accuracy, and reliability. In today's highly competitive business environment, businesses rely on high-quality data to guide their decision-making. Database systems, with their powerful data storage and management capabilities, ensure the fulfillment of various needs in information management. Data consistency reduces data redundancy and errors, while data traceability helps in tracking the change history and sources of data. This enables information managers to access the required data at any time, meeting the needs of business operations and decision analysis.

For example, a manufacturing company needs to ensure that data from various production stages can be transmitted and updated in real-time for close monitoring of production progress. Database systems can store and retrieve data at high speeds, enabling real-time updates of production data, ensuring that management can promptly understand the production status, and thereby remain agile in a rapidly changing market. Accuracy is also an integral part of information management; for instance, financial institutions need to ensure the accurate recording of customer financial data to meet regulatory requirements and tax reporting. Database systems, through accurate data storage and validation mechanisms, ensure the correctness of data during the input process, thereby avoiding potential risks to business operations caused by erroneous information. Reliability is equally crucial in information management; for example, an e-commerce platform needs to ensure that order data can be reliably recorded for order processing and logistics. Database systems, through transaction processing and backup mechanisms, guarantee data reliability, thus avoiding data loss and business interruptions.

In summary, the application of database systems in enterprise management provides strong support for information management by ensuring data timeliness, accuracy, and reliability. It not only enhances the value of data but also provides a solid foundation for business decision-making, operations, and compliance.

*3.1.2. Decision-Making and Strategies.* Database systems play a crucial role in decision-making and strategy formulation. Through data analysis and reporting features within the database, managers can gain a deeper understanding of an organization's operational status, market trends, and customer needs. This provides managers with powerful decision-making insights, helping them formulate wiser strategic directions. Additionally, database systems can integrate multiple data sources, providing managers with a more comprehensive information perspective, enabling a more accurate assessment of the impact of decisions.

For example, a global retail conglomerate looking to expand into new markets needs to determine which regions have high potential customer demand. Through a database system, they can analyze population data, consumer habits, and economic indicators in different regions to develop targeted expansion strategies. The database system consolidates a vast amount of data, providing managers with a more comprehensive information perspective, thus enabling a more accurate assessment of the impact of decisions.

*3.1.3. Business Process Optimization.* Database systems can automate and expedite business processes, thereby improving work efficiency. By storing the data required for business processes in databases, organizations can more effectively track work progress, allocate resources, and monitor performance. Database systems provide digital support for business processes, making them more transparent and controllable. Through real-time access to data, employees can perform tasks more quickly, reducing tedious manual operations and potential errors.

For example, a logistics company needs to manage the delivery process of goods. Through a database system, they can record the origin, destination, transport time, and status of goods. When changes occur to the goods, the system automatically updates the data, allowing managers to track the location and

status of goods at any time. This real-time data tracking capability not only accelerates the delivery process but also reduces errors caused by manual recording and communication.

### *3.2. Database Applications in the Retail Industry*

The retail industry, as a dynamic and ever-changing field, increasingly relies on database systems to cope with high-frequency transactions, vast product varieties, and diverse consumer demands. Database systems play a crucial role in the retail industry, supporting inventory management, sales analysis, customer relationship management, and cross-channel integration.

*3.2.1. Inventory Management and Sales Analysis.* Inventory management in the retail industry is a complex task that requires real-time visibility into inventory levels to avoid overstock or sudden out-of-stock situations. Database systems play an irreplaceable role in this area. By recording real-time sales data and purchase information, database systems provide retailers with an accurate understanding of inventory levels. This real-time inventory tracking capability not only helps reduce inventory backlog but also avoids missed sales opportunities, optimizing inventory turnover, reducing capital occupancy, and losses. Currently, most large supermarkets record real-time sales data, purchase information, and return information through database systems. This allows managers to have real-time insights into the inventory levels, sales rates, and popularity of each product. When the inventory of a product approaches the minimum threshold, the system can automatically trigger the replenishment process to ensure timely restocking and avoid missed sales opportunities. Additionally, by analyzing historical sales data, the database system can predict the demand for different products at different times, better plan inventory, and reduce the capital occupied by excessive inventory.

Database systems play a crucial role in sales analysis and forecasting in the retail industry, providing retailers with insights into consumer behavior patterns and market trends. By storing sales data, database systems can conduct sales trend analysis, revealing the best-selling products, popular buying times, and locations. These insights help retailers better formulate promotion strategies, plan marketing activities, and proactively respond to market fluctuations.

*3.2.2. Enhancing User Experience.* The ability of a database system to establish and maintain a close connection between retailers and customers is crucial. By storing customer information, purchase history, and preferences, database systems enable personalized marketing. Retailers can leverage this data to better understand customer needs, tailor recommendations and promotional activities, thereby enhancing customer satisfaction and loyalty. Current e-commerce platforms can use database systems to track customer purchase history and browsing behavior. Based on this data, the system can recommend products relevant to their interests, increasing conversion rates. At the same time, customers can enjoy a more personalized shopping experience as they receive customized coupons and recommendations.

With the development of the retail industry, a trend towards omni-channel sales models has emerged, and database systems play a significant role in this regard. Database systems can integrate sales data from physical stores and online stores, supporting unified inventory management and customer experiences. This seamless shopping experience not only improves customer satisfaction but also enhances brand image. Some multinational retail groups integrate sales data from their physical stores and online stores into the same database system, allowing customers to switch seamlessly between different channels, such as trying out products in physical stores and then placing orders online. The database system records customer behavior across different channels, providing retailers with a more comprehensive view of data, enabling them to better meet customer needs, improve overall sales efficiency, and enhance user experiences.

*3.2.3. Data Security and Payments.* In the retail industry, payment security and customer data privacy are of paramount importance. Database systems need to implement a range of security measures, including data encryption, access control, secure authentication, and more, to ensure that payment

information and customer personal data are not vulnerable to breaches and misuse. Maintaining payment security and data privacy helps protect customer trust and ensures that businesses comply with relevant data protection regulations. Many retail giants, such as Amazon, have implemented multiple measures for payment security. They use SSL (Secure Socket Layer) encryption technology to protect users' payment information on their websites. Additionally, they employ two-factor authentication, requiring users to provide a generated code from their mobile devices after entering their password, increasing the security of logins. These comprehensive security measures help ensure the safety of payments and customer data.

### *3.3. Database Applications in the Education Sector*

Database systems play a crucial role in student information management. Schools and universities need to efficiently store and manage large volumes of student information, including personal profiles, course registrations, and grade records, among others. With the help of database systems, educational institutions can easily maintain student information, ensuring data accuracy and consistency. This allows educational organizations to access student information more rapidly, manage academic records, and better meet the information requirements of parents and regulatory bodies.

*3.3.1. Student Information Management.* Database systems play a crucial role in student information management. Schools and universities need to efficiently store and manage large volumes of student information, including personal profiles, course registrations, and grade records, among others. With the help of database systems, educational institutions can easily maintain student information, ensuring data accuracy and consistency. This allows educational organizations to access student information more rapidly, manage academic records, and better meet the information requirements of parents and regulatory bodies.

*3.3.2. Teaching Management and Analysis.* Database systems provide robust support for course scheduling and resource management, ensuring smooth operations of teaching activities for both students and educators. Schools can utilize database systems to manage course timetables, classroom allocations, and educational resources. This helps avoid scheduling conflicts and enhances teaching efficiency. Educational institutions can also analyze historical data to optimize course schedules and ensure the efficient utilization of resources.

Database systems play a crucial role in teaching data analysis. Schools can leverage the educational data within databases to conduct in-depth analysis of student learning outcomes, performance, and trends. This assists educators in better understanding students' needs and challenges, optimizing teaching methodologies, and providing personalized learning guidance. Through data-driven analysis, educational institutions can more accurately assess teaching effectiveness and drive continuous improvement.

*3.3.3. Online Learning Platforms.* Online learning platforms are a significant innovation in the modern education sector, and database systems play a critical role in these platforms. Below are more detailed applications and advantages of database systems in online learning platforms:

- **Course Management:** Online learning platforms typically offer a multitude of courses, and database systems are used to store and manage the content of these courses, ensuring that students can easily access the required learning resources. Teachers can easily upload, update, and manage course materials, while students can access them anytime, anywhere.
- **Student Interaction and Engagement:** Database systems store students' personal profiles, discussion board information, Q&A interactions, and more. This enables students to communicate with each other, share opinions, and collaborate on projects. Teachers can also monitor students' participation and provide support and feedback.
- **Assignment and Grade Management:** Online learning platforms often use database systems to manage assignments and grading. Students can submit assignments online, and teachers can use the

system to distribute, grade, and record scores. This automated process saves time, reduces the tedium of assignment handling, and provides faster feedback.

- **Learning Analytics and Personalized Learning:** Database systems store students' learning data, including test scores, access history, and learning progress. This data can be used for learning analytics, helping teachers better understand students' learning needs and areas of difficulty. Based on this data, educational platforms can also offer personalized learning recommendations and resources to help students learn more effectively.

### *3.4. Database Applications in Government and Public Services*

The government and public services sector have diverse and specific information management needs, and the application of database systems in this field not only enhances administrative efficiency but also significantly promotes public participation and data transparency.

*3.4.1. Information Sharing and Data Transparency.* Government and public service agencies often need to achieve cross-departmental collaboration to better meet societal needs. In this regard, database systems play an indispensable connector role, supporting information sharing and integration. Database systems allow different agencies to store and access data, enabling efficient information flow. By avoiding the generation of redundant data, governments can gain a more accurate understanding of the entire system, thus making more strategic decisions. Departments such as municipal government, traffic management, and environmental agencies in any city need access to data related to traffic flow, pollution indices, and municipal facilities. Through a database system, these departments can integrate their respective data into a central database, facilitating data sharing and integration. This allows various departments to gain a more accurate understanding of the city's conditions, collaborate on policy-making, and planning. Database systems effectively prevent redundant data, improve data consistency, and help governments make more strategic decisions.

Database systems provide a new platform for public participation in government. Governments can release public data in the form of open data and allow the public to access it freely through APIs. This openness not only enhances the public's sense of participation in government decisions but also increases government transparency. The public can more easily understand government actions and decisions, thus promoting the dissemination and practice of democratic values.

*3.4.2. Crisis Management and Emergency Response.* Database systems play an indispensable role in government crisis management and emergency response. Government agencies can use database systems to store and analyze crisis data, such as natural disasters, epidemics, and more. This data storage and analysis capability provides the government with the ability to make quicker and more precise decisions, thereby better safeguarding public safety and well-being. Take the public health department as an example: a database system can be used to store and analyze the spread trends of epidemics, patient data, and the distribution of medical resources. In the event of an epidemic outbreak, the government can use the database system to quickly analyze the extent of the epidemic's spread and implement timely isolation and control measures. Real-time data in the database can help the government make more accurate judgments about the severity of the epidemic, thus making more precise decisions to ensure public safety and health.

## **4. Database System Optimization Strategies and Future Development Trends**

In the ever-expanding and evolving information management landscape, the optimization and future development of database systems have become critically important. This section will delve into database system performance optimization and future development trends.

### *4.1. Database Performance Optimization*

Database performance optimization is crucial for ensuring efficient information management processes. In this regard, strategies such as index optimization, query optimization, and data partitioning play a



vital role. Creating appropriate indexes and optimizing query statements can significantly enhance the speed of database queries. Data partitioning can also expedite specific queries by storing data in multiple physical locations.

#### *4.2. Resource Management and Allocation*

Effective resource management and allocation are essential for maintaining performance. Resources like memory, disk space, and CPU need to be allocated reasonably to ensure the smooth operation of the system. Dynamic adjustment of resource allocation allows for better adaptation to varying workloads and access patterns.

#### *4.3. Concurrency Control*

In a multi-user environment, databases need to handle concurrent data access. Concurrency control ensures transaction consistency and isolation while avoiding data conflicts. Through transaction isolation levels and locking mechanisms, databases can effectively manage concurrent operations and ensure data accuracy.

#### *4.4. Cloud Computing and Virtualization*

The future development of database systems is closely tied to cloud computing and virtualization. Cloud database services such as Amazon RDS, Azure SQL Database, and others offer scalability and flexibility, enabling organizations to better address evolving data needs. Database systems will also progressively adapt to virtualized environments, achieving higher resource utilization and flexibility.

#### *4.5. Future Development Trends*

- **Integration of Big Data and Cloud Computing:** As data volumes continue to grow, database systems will need to better address the challenges of big data. In the future, database systems will integrate with cloud computing to leverage elastic computing resources for handling massive datasets. Cloud-native databases and distributed database systems will become mainstream, capable of providing high availability and high-performance data storage and processing to meet the ever-growing data demands.

- **Heterogeneous Data Management:** Database systems will need to adapt to various data types and sources, including structured, semi-structured, and unstructured data. In the future, there will be a greater emphasis on managing and analyzing heterogeneous data effectively, integrating, storing, and querying different types of data to provide users with more comprehensive data insights.

- **Data Privacy and Security:** With increasing concerns about data breaches and privacy issues, the security of database systems will become even more critical. In the future, database systems will strengthen data encryption, authentication, and access control mechanisms to protect sensitive data from unauthorized access. Privacy protection technologies and compliance with regulations will be significant directions for the development of database systems.

- **Automation and Intelligence:** Future database systems will become more automated and intelligent. Automation tools for management and optimization will reduce manual intervention, enhancing database performance and stability. Artificial intelligence and machine learning will be applied to database systems, enabling intelligent query optimization, fault prediction, and automated task execution.

- **Edge Computing Support:** With the rise of edge computing, database systems will need to support data storage and processing on edge devices. In the future, database systems will adapt to the characteristics of edge environments, providing low-latency data access and real-time analytics capabilities to meet the demands of fields like the Internet of Things (IoT).

- **Data Governance and Quality:** As data continues to grow, data governance and data quality become more critical. In the future, database systems will focus on managing data quality, including data cleansing, data standardization, and data consistency. Data quality tools and data governance processes will receive greater attention.

## 5. Conclusion

In this article, the author delved into the extensive applications of database technology in the field of information management, along with the characteristics and challenges in different domains. By comparing relational databases and non-relational databases, the author understood their advantages and limitations in data storage and processing. The author analyzed the current applications of database systems in enterprise management, the retail industry, education, and government and public services. In enterprise management, database systems' capabilities to meet information management needs, support decision-making and strategic planning, and optimize business processes were highlighted. In the retail industry, database systems assist retailers in addressing the ever-changing market demands through inventory management, sales analysis, and improved user experiences. In the education sector, database systems provide more efficient and convenient solutions for student information management, teaching management and analysis, and online learning platforms. In the government and public services sector, database systems' abilities in information sharing, crisis management, and data transparency have enhanced administrative efficiency and public engagement.

In summary, database technology, as the cornerstone of information management, plays a crucial role in various domains. As technology continues to advance and demands evolve, database systems will continue to develop, creating more efficient, secure, and intelligent data management and analysis environments. This will drive innovation and progress in various fields, laying a solid foundation for future development.

## References

- [1] Han Qiang. The Application Research of Computer Database Technology in Information Management. *International Conference on Intelligent Systems Research & Mechatronics Engineering* 2015, 1-11.
- [2] Huang Guoli. "Analysis of the Application of Computer Database Technology in Information Management". *Proceedings of 2019 4th International Industrial Informatics and Computer Engineering Conference*, 2019, 21-24.
- [3] Jing Cai, and WenFeng Chen. Application of Computer Database Technology in Information Management. *International Conference on Machinery, Materials and Information Technology Applications*, 2016, 1345-1347.
- [4] Xie Peng. Tentative Analysis of the Function of Applying Computer Database Technology in Information Management. *International Conference on Mechatronics, Materials, Chemistry and Computer Engineering*, 2015, 203-207.
- [5] Luan Xue De. "Computer Database System in the Application of Information Management." *Applied Mechanics & Materials*, 2014 599-601.
- [6] Bingbing Zhang, and C. Room. "Research on Data Query Conversion Between SQL and NoSQL Database. *Electronic Science and Technology* 2017.
- [7] Srivastava, Pragati Prakash, S. Goyal, and A. Kumar. Analysis of various NoSql database. *International Conference on Green Computing & Internet of Things IEEE*, 2016.
- [8] Karde, P. P , V. M. Thakare , and H. R. Vyawahare . Brief Review on SQL and NoSQL. *South Asia Management Association* 2017.
- [9] Ali, Wajid , et al. Comparison between SQL and NoSQL Databases and Their Relationship with Big Data Analytics. *Asian Journal of Computer Science and Information Technology* 4.2(2019):1-10.
- [10] Minelli, Michael , M. Chambers , and A. Dhiraj . *Information Management*. John Wiley & Sons, Inc. 2013.