

## Research on Database Construction and Application Scenario

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**Abstract:** Under the impetus of the development of network technology, the value of data is gradually recognized by people. The emergence of cloud computing technology has created favorable conditions for data storage and access. However, how to fully exploit and even realize the value of data and promote data to help people live and work is the core issue of database construction. Based on this research, the application of database construction in the airport integrated management scenario is carried out. Firstly, the overall framework design is carried out, and the system architecture of the airport integrated management database is analyzed from five aspects. The application of database construction in the airport integrated management scenario is applied. From the aspects of design and characteristics, the research finds that the construction of the airport comprehensive management database is conducive to the processing of a large amount of information and the value of the data, thus creating favorable conditions for the construction of the airport integrated management database, and hopes to promote The development of China's aerospace industry has helped.

### 1. Introduction

Big Data is a phenomenon and thought, but it is not a technology and product, and it is a hot spot in the field of IT research [1]. Big data has the following characteristics: large data volume, multiple data types, fast processing speed, and low value density. Based on the above characteristics, the traditional data processing method can no longer meet the data processing needs of the big data era [2]. This requires companies to respond with big data. Big data technology combines multiple functions into one, and is a collection of multiple technologies [3]. The key technologies applicable in big data are as follows: one is task decomposition technology; the second is data warehouse technology; the third is visualization technology; the fourth is data distribution technology [4]. At this stage, most of China's airports have built a number of business information systems, the construction of these information systems to a certain extent to meet the airport's business needs [5]. How to use modern technology to perfect these systems, fully exploit the hidden value of historical business data, and then promote the improvement of airport management level, and increase the operational income of the airport has become a problem to be solved in the construction of airport integrated management database [6]. Therefore, it is of great significance to analyze the application of big data in the construction of airport integrated management database.

### 2. Overall Framework Design

At present, the construction model of China's airports usually takes the database as the core [7]. Under this model, the main source of information is flight information, and the middleware platform is used as the basis to realize the coordinated operation of various business systems of the airport. For example: flight display system, broadcasting system, equipment security system, etc. Based on the operation mode of the domestic airport, data will be generated in terms of service and security, such as flight information data, passenger service data, baggage data, etc. Therefore, the amount of data generated by the airport every day is very large [8].

In the era of big data, some enterprises will produce the ills of massive data and lack of knowledge. Although the airport generates massive amounts of data every day, some of the airport's databases can only process flight data in real time, and cannot dig deep into the hidden value of

these data [9]. Therefore, building an airport integrated management database, through the application of big data, while managing data, it is crucial to fully exploit the value of data.

The data involved in the construction of the airport integrated management database is very large. This information includes both real-time operational data and some past data [10]. The construction of the database should be infiltrated into all aspects of the comprehensive management of the airport, such as: flight operation management, passenger number management, and equipment operation efficiency management. The database constructed by applying big data should set different attribute sets according to different management aspects, and collect, analyze and process the data in a targeted manner to improve data processing efficiency. In addition, the attribute reduction algorithm can be used to eliminate redundant and worthless data in the attribute set, reduce the amount of data in the attribute set, and then use the classification rule knowledge to represent the data set represented by the decision tree and store it. In the rule knowledge base. Collecting, restructuring, and categorizing multiple data in the database is the processing flow of the system data. After that, you need to use the multidimensional analysis tool to classify the data in the database and filter out useful information. Finally, the database should be combined with the model library and method library. Finally, through the use of visualization tools, the data analysis and processing results are presented to the client.

### **3. System Architecture of the Airport Integrated Management Database**

#### **3.1. Data source**

A large amount of data is generated during the operation and management of the airport, so there are many data sources involved, such as passenger data, equipment monitoring data, logistics transit data, management data, business data, flight data, and so on. At the same time, there will be a lot of external data, such as weather environment data, air traffic control data, network data and so on. These data have different attributes and characteristics, so there are significant differences in the database and region of the data store.

#### **3.2. Data processing**

Data processing will process the data in the data storage area and get two kinds of tables: one is the fact table; the other is the loading dimension table, which creates favorable conditions for the data value mining. Since the data in the data source is prone to crossover, it should be classified. When it comes to data classification, it needs to follow the principle of interactivity. Data can be divided into two types, mainly referring to unstructured data and structured data. At the same time, because there is some redundant data, missing data and noisy data in the original data, it is necessary to process the useless data, and the staff can solve the problems of the above data by transforming, purifying and standardizing the use of data processing methods. After processing, the database system automatically categorizes and stores the data.

#### **3.3. Integrated management database**

The integrated management database is capable of storing forecasted topics and information. The results obtained after the prediction is completed will be stored in the database, which is the basis for the formation of the decision information base. For example, flight operation analysis management, by storing a large amount of data related to flight operations in a database, and comparing and analyzing with historical data, the best operation and management solution is finally obtained. The formulation and implementation of the program will help improve the management and service level of the airport, and improve the efficiency of the use of airports and aircraft equipment, thereby reducing the operating costs of the aircraft. For example: lighting equipment, escalators, passages, etc. In addition, by separating data databases and data marts, the ability of the database to solve problems can be enhanced, enabling them to focus on data integration and cleanup issues, and data marts can provide the basis for decision making. At the same time, the database will play a role as a transfer station between the data source and the data mart, which is beneficial to

reduce the difficulty of processing data in the data mart. The reason is that the database can preprocess the information of the data source. This avoids the impact of data source changes on the data mart.

### **3.4. Data analysis and extraction**

Staff can use the online analytical processing technology to use the processed data to provide support and help for the decision analysis process. The information in the database is the basis for joint analysis processing. Based on the flight operation law, develop a matching model library and knowledge base, then calculate and process the data in the database, and provide forecasting and analysis services, and finally obtain conclusions, make decisions for the airport management department, and provide reasonable Suggestions. In view of the characteristics of the existence of the airport, we should divide the data into two types, one is non-real-time data, and the other is real-time data. Then, the cloud computing platform is lapped, and Hadoop technology is used to realize efficient processing of data.

The database is the basis of the knowledge base, and the use of data mining tools is an important condition for the formation of the knowledge base. The knowledge base in the airport database system contains the knowledge in the aerospace field. The assistant decision-making is the main function of the knowledge base. The decision-makers can call the knowledge in the knowledge base to enhance the effectiveness of the decision-making. The model library and method library can provide mathematical models and decision-making information for decision problems. The method library consists of two parts: one is the method algorithm class library, and the other is the prediction method dictionary. The composition of the model library consists of three parts, namely the model parameter dictionary, the prediction model dictionary and the model repository. Online analytical processing exchanges and shares information with knowledge bases, method libraries, and knowledge bases, and enables predictive and analytical functions through dialogue with customers.

### **3.5. Data visualization**

It is the fundamental purpose of building an integrated airport management database to enable managers to use the database more conveniently and efficiently, obtain valuable information from them, make correct decisions, improve service and management quality, and promote the development of aviation industry. Therefore, it is critical to ensure the effectiveness of the interface. Designers can incorporate visualization tools into the architecture of the database system. The airport integrated management database contains a huge amount of information, and there are many data sources, especially unstructured data. The total amount is very large, which increases the complexity of data application, which is reflected in the dynamics of multi-source heterogeneity and data. Interactively. Therefore, it is necessary to use modern technology to adjust the data analysis and processing methods, and to develop intelligent and automated visual analysis software through the use of human-machine reasoning technology and intelligent vision technology. This visual software can efficiently perform various tasks. deal with. Applying it to the airport integrated management database allows staff in various departments of the airport to obtain valuable visual information through the use of data analysis functions according to their own work needs.

Finally, combined with the actual situation of the airport, the system architecture of the airport integrated management database can be carried out from the above five aspects, as shown in Figure 1. From the figure we can find that the airport integrated management database consists of five parts: data processing, data analysis and extraction, data source, database and visualization.

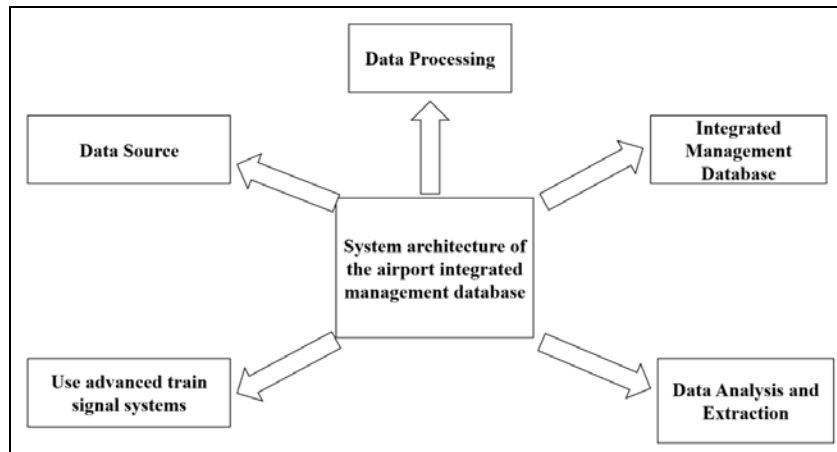


Fig.1. System architecture of the airport integrated management database

## 4. Application of Database Construction in Airport Integrated Management Scenario

### 4.1. Application system design

In the design of the data layer, the data in the system is stored in a unified manner, and the basic traffic operation information is recorded by the data storage function of the system layer. The data to be recorded includes basic data, model data and indicator data. Several different data have different research significance in the system application process.

In the design process of the middle layer, it is necessary to analyze the basic construction in the system layer, including the GIS server in the basic data application, the data access middle layer and the spatial data engine. In addition, REST, SOAP, and HTTP should be designed and applied in the middle layer of the system.

For the design of the application layer, the basic query language design should be designed to ensure that the corresponding database transmission system can be constructed in the design process of the basic query language. In the design process of the application layer, the user is mainly designed to query the map, the user queries the data input conditions, and the user queries the data analysis indicators.

Finally, the application system design part can be designed from the above three aspects, namely, different designs from the data layer, the middle layer and the application layer, as shown in Fig. 2.

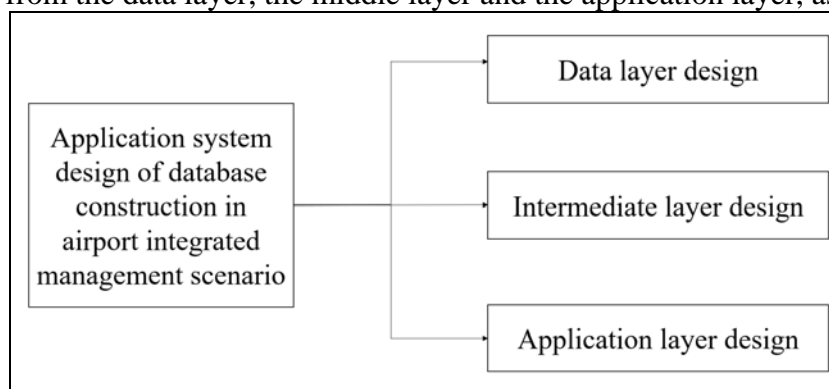


Fig.2. Application system design of database construction in airport integrated management scenario

### 4.2. Analysis of application characteristics

For the function design application in the system database design, it can meet the information data query application requirements of many users, realize the scientific planning of airport data transmission, and enable the airport management department to carry out special work data in the application process of the database. The analysis realizes the scientific planning of system data transmission application design and ensures the scientific and rationality of data transmission

planning.

In the construction of the data model, the basic data and the information application in the model construction can be transmitted in real time, which is convenient for the relevant airport managers, and can timely command and convey the traffic by means of data transmission.

For the extraction and evaluation of data materials, a large range of data transmission can be transmitted to the computer system in time, and a relatively complete data analysis report is formed in the internal operation of the system to ensure the accuracy of the information report. The airport information processing provides a reference.

According to the data feedback of the airport operation report, there are many data development links in the airport operation feedback of the data. With the control function design of the database, the overall database control efficiency is improved, and in the data application of the report, it can be timely Learn about airport information.

## **5. Conclusion**

In the process of rapid development, China's airports have accumulated a huge amount of data. In the past, due to the lack of advanced technology, the airport did not realize the value of historical data. Based on this, we first gave a brief overview of big data through big data technology. Application, deepen the value of data, and use it as a basis to continuously improve the management level and service quality of the airport. Secondly, it analyzes the data processing problems that the airport needs to face. For example, in terms of service tourists, the way of serving tourists in the past is passive service, and the use of big data technology can predict and analyze the needs of tourists. The results of the analysis will provide services for tourists, which will improve the service quality of the airport. Finally, the proposal of applying big data technology to build an airport integrated management database is put forward. The specific performance is that managers can use big data technology to analyze historical data of flight delays, clarify the causes of problems, and formulate targeted countermeasures to achieve sudden Prevention and control of the situation. The research shows that the construction of the airport database is conducive to the processing of a large amount of information and the value of the data, thus creating favorable conditions for the construction of the airport integrated management database, hoping to improve the airport management level and service quality.

## **Acknowledgement**

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