

## Design and Implementation Analysis of Database Network Management System Based on Data Mining Algorithms

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**Abstract:** In recent years, with the rapid development of data acquisition and storage technology, a large amount of data has been accumulated in many fields. In order to discover valuable knowledge and rules from data, people combine database, statistics and machine learning technology to propose data mining to solve this problem. In this paper, the design process of database in network management system is discussed, and a general information management system is designed. The system adopts a three-tier architecture in the overall structure, and the C/S-based management mode guarantees the scalability of the system. Through the log analysis system, the system health warning function can be realized to a certain extent. In the practice, the design content is evaluated, and then the database design content in the network management system is smoothly put into operation.

### 1. Introduction

The design and implementation of the database in the network management system means that when the network management system runs for the first time, the system initialization process traverses the entire campus network and establishes objects of the managed devices, and stores some fixed information into the database. The database system is a more important part in the process of building the entire network management system, providing powerful data support for the normal operation of the system [1]. In the design of the database application system, a good database structure is the basis for the benign operation of the application system. With the continuous development of database technology and information technology, the ability to generate and collect data has rapidly increased, and the size of the database has expanded rapidly [2]. In order to effectively manage the integrated communication network, a new measurement ship communication network management system is specially established to provide real-time working status and performance parameters of the communication network and communication equipment for managers [3]. Through this mode, some important and common information can be placed on the server side, and the distributed clients can easily access and use this information through the network, while the server side can monitor the situation of each client in real time.

In the field of data mining, clustering analysis is an important research topic. It mainly searches for similarities between data from a record set of a database, and classifies the data so as to make the data in different categories as different as possible [4]. At the same time, the security and reliability of the database in the network management system is very important to the normal operation of the network, while the opening of the computer network and the information security in the database [5]. Through the whole process of understanding the database design content in the network management system, the network data management has a more intuitive understanding. This requires security to be emphasized in the construction of the network management system. It is the most important research hot spot in the field of network management, and has important practical significance for the normal operation of computer networks. This paper introduces the design and implementation of database network management system based on data mining algorithm.

## 2. Methodology

The database system is only used to store some fixed information. When the network management system runs for the first time, the system initialization process traverses the entire campus network and establishes the objects of the managed devices, and stores some fixed information into the database: the network Table, Node Table, interface Table. In order to attribute the various information nodes in the network management system, it is proposed to establish a unified data collection and collation process, and then construct a database system in the network management system, which can realize automatic cross-domain calling of network management services. Different adapters are used for different log files, such as an adapter for the analysis of the generated system log files, and another adapter for the analysis of user operation log files. The representation method of managing network resources is to represent these resources in the form of objects. Each object is a data variable representing the characteristics of the managed network nodes. The database server uses Sybase database, which can process a large amount of data while maintaining the integrity of data and providing many advanced management functions [6]. Because public objects are persistent and have inheritance characteristics, persistent behavior can also be inherited. Therefore, data structure and persistence behavior are similar. Persistent behavior will be expressed in the program, and the inheritance of the object can be expressed in the database.

At a higher level, the network consists of static nodes and links with high speed and low packet loss. In network management, nodes can operate and exchange information as traditional IP-based networks. However, when the node moves down in the hierarchy, the node is more mobile, the connection quality and capacity drop sharply, and the concept of IP network management fades out. At the bottom of the hierarchy, the network is completely intermittently connected, and network management is decentralized, as shown in Fig 1.

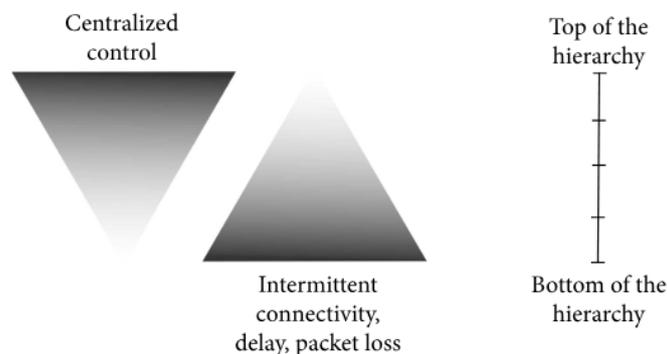


Fig. 1 The relationship between the change of network quality and the centralization of management and the hierarchical status in the organization

When designing a database in a network management system, the goal to be achieved is to enable retrieval and invocation of information, and to minimize manual intervention in the data management process. The system adopts a multi-level architecture, the main purpose is to achieve a loose and confusing, so that each level can be relatively independent changes. Here, the programming idea of interface-oriented programming is adopted to realize the layering of the system. In the reference model, a physical network is a collection of one or more networks that use the same protocol. It is the basis for data transmission, and it can be a local area network using protocols such as Ethernet and Token Ring, or it can be a wide area network [7]. Secondly, the business logic of the middle layer is developed in standard language, independent of the platform, and the program can be easily transplanted. Objects should be persistent and mapped to Tables in the database. Common Tables, such as network objects, interface objects, node objects, are designated as a Table. Each (original) attribute becomes a column of the Table. Each instance of the class is represented by a row in the Table. In a specific network management task, it is necessary to determine each link of the design plan according to the overall design content, and to do a good job of software coding and performance development for each link, and finally to organize the overall

design plan.

As shown in Fig 2 below. In a landscaped manner, managers share responsibility for monitoring and reporting with other nodes at the same level in the hierarchy. As a result, managers exchange information with other managers and pass other managers' data horizontally and upwards in the hierarchy according to a given strategy.

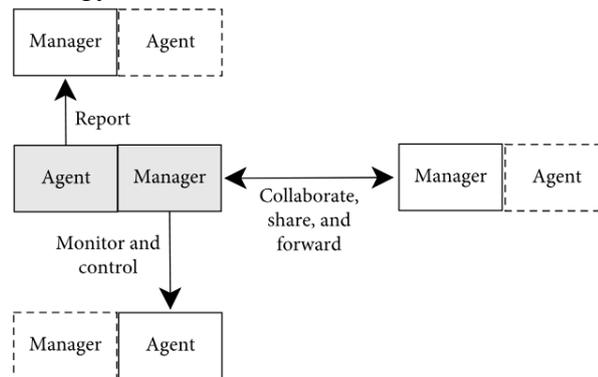


Fig. 2 Responsibilities for managing roles (ie participant types) and relative position settings in the hierarchy from the perspective of the highlighted node (middle left)

The broad view adopted is the process of mining interesting and meaningful knowledge from large amounts of data stored in databases, data warehouses, or other repositories. It is the processing entity that accepts requests from the Manager in the community, processes them if they are legitimate, and finally issues the appropriate response. When the business logic and the data to be processed continue to increase, you can take additional servers to achieve good performance. Some of the more fixed information is stored in the database: managed object state Table, event Table, type reference Table, user Table, and log Table. These data sets are derived from different network channels. The information of the database mainly comes from the management information base under SNMP protocol, the private information reserve of the network terminals, and the measurement data information in the network management system. According to the data mining requirements of users, the database or data warehouse server is responsible for extracting relevant data. Additional index labels are added when representing objects in Tables. Because these object identifiers are represented by integer strings, this organizational approach naturally has the characteristics of dictionary sorting. The three-tier architecture can provide better and more timely information possibilities than the existing PCLAN, two-tier client/server or host/terminal application structures at low cost.

### 3. Result Analysis and Discussion

By designing the framework of the database model in the network management system, a large amount of information data can be flexibly operated in the network database model, and the effective collection and invocation of data can be realized through the design of information retrieval function. When discussing configuration management, network devices are often Abstracted into managed objects, which can be either host systems or network interconnection devices such as routers and hubs. This knowledge may include conceptual hierarchy, which is used to organize attributes or attribute values into different Abstraction layers, in which the user is confident that the knowledge can also be included, and can be used according to the interest of the unexpected evaluation model. Each manageable device in the network includes one or more sets of data, all of which are network information or hardware information about the managed device. In addition to knowing the information about each device, configuration management also understands and monitors the relationships between these devices. This relationship is often referred to as the network topology. The main role of the network topology is to understand how the various network objects are interconnected. After the screening of the automatic database retrieval function in the network management system, the final information data is saved. In this way, a cyclic network

management system database retrieval process is completed.

In general, the smaller the unit selected, the larger the possible range of variables, and the greater the impact on the clustering results. Therefore, in order to avoid the dependence of clustering results on unit selection, the data should be standardized. After standardization, the degree of dissimilarity between objects is calculated based on the distance. It is defined as:

$$S_j = \frac{1}{\sum_{i=1}^n (S_r)}, (0 < (S_j) \leq 1) \quad (1)$$

If the two states of a binary variable are of the same value and have the same weight, then the binary variable is symmetric. At this time, the most famous simple matching coefficient is to evaluate the difference of the sum of two objects, which is defined as follows:

$$D_j = \sum_{i=1}^n (H_p \times V_p) \quad (2)$$

Assuming that the number of states of a nominal variable is S, and each state value can be represented by a letter, a symbol or a set of integers, the degree of dissimilarity between the two objects can be calculated by a simple matching method:

$$S(r_k) = \sum_{r_k \neq r_i} w(r_i) D_r(r_k, r_i) \quad (3)$$

Here w is the number of matches, that is, the number of variables that are the same as the value, and Dr is the number of all variables.

Communicate between the user and the data mining system, allowing the user to interact with the system, specify data mining queries or tasks, provide information, help search focus, and explore data mining based on intermediate results of data mining. Allowing multiple network managers to perform any operation other than network monitoring (acquisition and trap operations) would be difficult. Network control through setup operations is clearly a more sensitive area. Application platform security refers to the security of application software services based on network system, such as database server, e-mail server, Web server and so on. Adjust the results of statistical analysis to control network performance: Provide useful network performance reports. Among them, the most important function is monitoring and adjustment. The monitoring function is mainly the performance management function of tracking network activities. The adjustment function is to adjust the network to improve its performance. The database system itself can be divided into relational database, object-oriented database, transaction database, deductive database and so on according to its data description, organization and storage. Each kind of database system needs its own data mining technology, so the data mining system can be classified accordingly.

By studying the framework design of the database system and combining with the information sources of the database in the network management system, the whole process of the database design in the network management system is tracked, and the unique advantages of the database module in the system are found. The most important function of performance management is to help network managers reduce overcrowding and impassability in the network, so as to provide users with a level of sTable services. Data mining automatically searches for predictive information in large databases. A lot of problems that need manual analysis in the past can be quickly and directly concluded from the data itself. It requires a better database schema for the specified application environment, establishes a database application system, and enables the system to efficiently store data to meet the various application needs of users. In the role access control system, one user can be assigned multiple roles, and one role can be assigned multiple users. Managers can monitor the use of network devices and connections, and the collected data can help managers determine usage trends and isolate performance issues, even before they have a detrimental effect on network performance. The database system can enhance the communication between the network ports while ensuring the independent operation of the management nodes,

thereby realizing the management objectives of the complex network tasks in the network management process.

#### 4. Summary

Data mining is an emerging technology generated after the development of database technology to a certain stage. Its purpose is to mine useful knowledge from a large amount of data, so as to realize the effective use of data resources. Based on the research and analysis of the development status and trend of network database system based on data mining algorithm, this paper discusses the structure of network database system based on data mining algorithm, and clearly proposes the implementation of network database system based on data mining algorithm. And its safety aspects. Through the analysis of the network management system, the network management information model is established, and the management information tree is constructed. On this basis, the network management database model based on relational database application is given. The application simplifies the program design of the data interface. Users can easily browse, query, insert and modify the original data, as well as the operation of the user bound to the switch, so that the system has strong vitality. Because of the independence of the module, for different user needs, only adjusting the static web page framework and interface generation function can be used without changing the background management module. The design scheme has good portability and flexible choice space for users.

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