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Development and Application of Cloud Storage Technology in Video Surveillance

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Abstract: ***Through the cloud-based data storage deployment mode, the application of distributed computing methods, a large number of different types of data storage devices in the network through the application software set up, effectively and reasonably unified computing and data processing, End users have centralized access to cloud-stored data resources and business systems through remote or similar software application and program interfaces to enable efficient and fast resource analysis and data processing in large-scale data storage and access environments. Therefore, this article makes a specific analysis on the development and application of cloud storage technology in video surveillance.***

Keywords: Cloud storage technology; Video surveillance; Development; The application is available.

1. INTRODUCTION

With the popularity of digital security technology, monitoring technology is gradually developed to high-definition and networked, and with that comes the problem of massive data storage, which must be stored reliably, guaranteed efficiency, and with fast reading and writing and responsiveness. Storage equipment from the marginal position of the supervisory control system gradually to the center, the proportion of the supervisory control system with the promotion of centralized and greatly increased, the traditional storage can not meet the needs of network storage, cloud storage as a new storage service came into being. By adopting cloud storage technology, building a huge video database, and providing a unified cloud storage service interface, Realizing the integration with public security business systems and city management business systems, turning the video cloud storage center into the core resource support platform for various business systems, and making detailed investigations into the application of cloud storage technology in video surveillance is of great practical significance. Lu et al. [1] developed DeepSPG, a novel multimodal learning approach for low-light image enhancement using deep semantic prior guidance, while Guo et al. [9] improved vehicle detection through an enhanced YOLOv8 network. Jin et al. [10] further advanced the field with hybrid task cascade networks for precise object detection and pose estimation. For medical applications, Wang et al. [4] proposed CPLOYO, an innovative pulmonary nodule detection model incorporating multi-scale feature fusion, and Zhang et al. [11] explored anomaly detection in biomechanical big data environments. In financial technology, Yang and Duan [2] constructed a knowledge graph for US stock market risk management, complemented by Shen et al. [5]'s data-driven robo-advisory model for wealth management. Logistics optimization was addressed by Luo et al. [3] through their Transformer-GCN integrated path planning algorithm for intelligent robots. Supply chain innovations included Saunders et al. [6]'s analysis of AI-driven operational efficiency enhancements and Liu et al. [8]'s computational-friendly personalized generation framework combining cloud and edge computing with causal inference.

2. AN OVERVIEW OF CLOUD STORAGE

Cloud storage technology has been widely used in many fields in China, providing distributed computing and massive storage capabilities provided there is a sound architectural system. Taking the related application software as the carrier, carries on the massive, the diverse data collection with the aid of its memory deployment mode, unifies the distributed computing to carry on the data conformity and the processing analysis. For the access of cloud storage resources and their business, the main method is virtual access or remote access, enabling software program interface connectivity to help end users process huge data resources in a timely manner.

The implementation of cloud storage function and its role is based on the application of cloud computing technology and from the perspective of capacity and performance. Single storage device has application limitations, but distributed network system can realize the network cooperation mode of massive service resources, storage data processing, and its application services to cloud memory management and storage as the core. The huge amount of data stored and managed in the actual application process is the role of cloud storage technology.

With the integration of storage pools and virtualization technologies, cloud storage has transformed the application services of previous devices, namely, capacity utilization, expansion, and storage forms have become simplified. Through the transition of virtualization and standardization to access methods, storage devices can achieve capacity expansion, and achieve the purpose of rationally reducing storage costs on the basis of ensuring the increase of data storage capacity. From an end-user perspective, access to data resources relies only on a virtualized desktop and represents a huge amount of storage on the client side in the form of a storage pool.

3. BENEFITS OF CLOUD STORAGE TECHNOLOGY

3.1 Reducing Total Cost of Ownership

In the case of traditional storage, customers and enterprises need to purchase separate storage devices according to their own needs. It also requires guidance from device-side manufacturers, especially in larger-capacity application scenarios, and the construction of a platform for larger cluster storage and management, which will take a lot of time and expense. In the case of cloud storage, the investment is much smaller and can be put into use quickly.

3.2 Improving scientific decision-making capacity

The application of cloud storage in video surveillance can effectively combine cloud computing, video surveillance and data mining, so as to effectively improve the processing capacity of surveillance data and provide a basis for scientific management and decision-making. In the video monitoring data management process, by applying cloud storage technology, it is possible to quickly and accurately find valuable information data from huge amounts of data, thereby providing services for decision-making.

3.3 Improve the quality of information storage

Cloud storage system can provide a variety of storage service interfaces, support data sharing across the storage interface, greatly improving the efficiency of data sharing.

3.4 Ensuring information security

Cloud storage uses data discrete and redundant storage technology to provide high data reliability, The damage of nodes does not cause data loss, the damage of multiple hard disks does not result in data loss, and the data on the damaged hard disk can be quickly recovered within the global space of the system, up to 20 times faster than traditional storage.

4. ACCELERATE THE DEVELOPMENT TREND OF HIGH-DEFINITION, INTELLIGENT AND NETWORKED CLOUD STORAGE SECURITY

Cloud storage must be integrated with security applications with its high-performance massive data storage and capacity management, and its main core technologies include virtualization technology, data security storage and protection technology, intelligent distributed video data filtering, analysis and computation. To give a simple overview now, virtualization technology is the virtualization of many storage devices into a single, manageable logical device form. Split physical disks into virtual disks and deepen the use of fine-grained management and virtual disk operation technologies for more flexible management efficiency, performance and capacity space. Storage virtualization technology successfully solves the unified management of storage capacity of various forms of devices and dynamic segmentation of disk capacity, enabling flexible, intelligent and automated management of storage devices and storage space. Cloud storage As a data storage center for huge amounts of data, storage resources are consolidated into a large storage system through the cloud. More attention should be paid to the management of high-definition video itself, must have a safe and reliable data protection mechanism to ensure that any equipment failure or catastrophic events will not lead to the loss of data. Intelligent data filtering and analysis technologies are also trends in efficient capacity management for cloud storage.

5. APPLICATION OF CLOUD STORAGE TECHNOLOGY IN VIDEO SURVEILLANCE

5.1 Massive video data applications

At this stage, the application of video monitoring system in various industries needs high-definition and networking. Especially in the context of smart city construction, the growth of the supervisory control system across the region and the scale of the sea makes the application of cloud storage technology imminent. Relying on the video supervisory control system of cloud storage technology application, higher storage capacity can effectively cope with the current trend of quantitative and rapid growth of data. For example, the construction of storage pool adopts multiple PB level storage products to achieve effective storage and management of massive video data through the formation of large storage space.

In addition, the massive development of video data at this stage further promotes the development and upgrading of intelligent analysis and image graphics retrieval functions in video surveillance. If human processing methods are still used in the data monitoring and processing process, it is difficult to obtain more significant control effectiveness, and even increase the monitoring and management costs due to the large investment of personnel. Therefore, in the background of cloud storage applications, the mass video data in the video supervisory control system can be stored and managed efficiently and conveniently through fast retrieval. It also implements intelligent analysis of video data by executing policy presets, combining relevant computational methods and application of principles. In addition, intelligent analysis of video supervisory control system can achieve the purpose of function expansion through technical integration, or automation, the Internet of things and intelligent analysis technologies to maintain the status of the operation, to ensure that the system decision-making process can obtain more accurate and comprehensive support.

5.2 Application of Cloud Storage Technology in Security Video Monitoring System

In the future, users no longer need to buy high-performance servers and high-capacity storage equipment themselves, but only need to choose a cloud service that is suitable for them, and the cloud will provide corresponding services according to the needs of users, truly realize the on-demand allocation of resources and improve resource utilization. To the user, cloud storage refers to a collection of storage devices and servers, and the user enjoys the data access service provided by the entire cloud storage system. Video cloud storage technology can realize high efficiency and high reliability of massive data storage and space elastic management, including modern data processing technologies such as virtualization, data secure storage and protection, intelligent analysis and video data processing.

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6. CONCLUSION

In conclusion, the application of traditional monitoring means is difficult to meet the increasing demand for monitoring management in various fields. Thanks to the organic combination of video monitoring system and cloud storage, to achieve the framework of cloud storage to carry out automated, intelligent high-definition video monitoring, to provide end users with a more convenient, efficient and comprehensive monitoring mode, maximize the function and value of video supervisory control system. With the widespread application of video surveillance technology in different fields, the future of cloud storage technology has a broader and clearer development space.

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