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Research on Construction of Technical Defense Network in University Campus Based on Digital Hd Monitoring Technology

Wang Qian

Xi'an Institute of Aeronautics, Xi'an 710077, China

ABSTRACT. *At present, the digital high-definition monitoring system is at a high-speed development stage, and the technologies involved are also more diverse and specialized. For the application of intelligent monitoring in college security work is a great help. The thesis discusses the technical discussion, requirements analysis and functional process description of the digital high-definition monitoring system using at the university security monitoring system, in order to discuss the application of digital high-definition monitoring in high-campus like areas.*

KEYWORDS: *University security monitoring system; Hd transmission; Data storage; Video integration; Video quality detection*

1. Introduction

At present, the digital high-definition monitoring system is at a high-speed development stage, and the technologies involved are also more diverse and specialized. Therefore, this thesis introduced several key technologies involved in digital high-definition monitoring systems, at the same time, it starts with the detailed analysis of the needs of university security monitoring of digital high-definition monitoring systems constructed in the work and the solution of some technical problems, looking for a Systematic technical solution to problems encountered in the actual work of campus safety monitoring.

2. Digital Hd Surveillance' Applications and Where They Need Improvement

2. 1 Digital Hd Surveillance' Applications

At present, the integrated high-definition monitoring systems at home and abroad all adopt advanced system architecture and modular software design technology, supporting hierarchical and domain-based management methods, and can expand the system according to changes in the monitoring area. The system can also standardize and open the programming interface, provide a unified interface for other business development. The current high-definition intelligent monitoring solution has the following advantages[1]:more reliable video storage and faster video retrospective query; dual-stream transmission of video occupies small bandwidth and strong real-time performance; adopts standard image compression protocols and dynamic image coding patents, Ensure image clarity; all IP unified management, convenient and easy to use; compatible with other systems, improve the use efficiency, suitable for future development trends; the advantages of humanized functions such as electronic maps, fault alarms, system auditing are more obvious[2].

2. 2 Where Digital Hd Surveillance System Needs Perfection

At present, the technical advantages of large-scale high-definition monitoring platforms are obvious, but there are also some issues that need to be paid full attention to. For example:some surveillance platforms are constructed in stages, the brands of front-end surveillance cameras are different, and the number of video processing and forwarding equipment is large. How do you achieve unified management? Facing a variety of network environments, it is also necessary to consider the networking of platforms with different permissions, different tasks, and different standards[3]. Otherwise, difficulties will occur in the implementation of docking integration. These problem must be given sufficient attention when developing platform at the stage of designing it. Based on

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the above reasons, the principle of "refinement to zero" can be adopted in the implementation of the construction, and the high-definition monitoring system can be divided into independent small functional modules construction by function classification, regional layering, and business grading method. After solving the problem of each small function module, the various function modules are connected according to the corresponding relationship and belonging rights, and integrated platform management-management, so that the interconnection of different models of equipment can be achieved; laying the foundation for the next system expansion, the network hardware foundation also prevents the situation that the system construction can be completed overnight and cannot be upgraded[4]. At present, in the construction of monitoring systems, solutions that are compatible with high-definition and standard-definition systems must be prepared. For example, the video streaming media can be reprocessed through "middleware server" technology to enable the system to support real-time browsing of analog video and high-definition display of digital video Technical requirements; in the display part of the system, according to different user business needs, multi-screen polling display, multi-type video trigger switching mode, so as to achieve better monitoring results[5].

3. Intelligent Analysis and Processing Mode of Digital High-Definition Monitoring System

3. 1 Video Anomaly Detection in Intelligent Analysis

The analysis of abnormal behavior and the detection of target objects are the key links in video anomaly detection. They are also important developments in the application of high-definition surveillance in college security work. To achieve the goal of abnormal behavior analysis, it is required to select those characteristic frames that are universal and can be distinguished from normal factors for their respective environments when performing anomaly detection[6]. For example, the relatively stable image background in the picture is used as a reference feature, and then the real-time picture is continuously compared with it to detect abnormal behavior in the picture. When selecting a reference feature, you can use the pixel features of information such as grayscale and color components, and you can also consider using the features of the compression domain for judgment. Thus, analysis algorithms such as multi-person wandering, single/dual alert crossing, abnormal speed, illegal parking, perimeter intrusion, wandering alarm and retrograde detection are realized. When developing intelligent video analysis, we must also pay attention to how we can reduce the disturbance to the video picture and improve the accuracy of system analysis and recognition.

For example, when recognizing various people and objects in the monitoring screen, only when the targets in the monitoring screen are accurately identified can the corresponding intelligent analysis be performed. The resulting crossing, entering, leaving, appearing, disappearing, abandoning, staying, and scene change recognition are based on the action mode set in a predetermined area in the HD surveillance screen. Once the video analysis system finds an action that meets the predetermined mode, it will trigger The corresponding alarm signal is quickly transmitted back to the background monitoring center. If high-definition video surveillance can be used to achieve this goal, the campus environment is complex and the monitoring range is wide. The activities that require attention can be promptly prompted, which greatly improves the monitoring efficiency and response rate to unexpected events, and improves campus's safety level.

3. 2 Integrated Analysis of Video and Audio

At present, intelligent analysis and processing based on sound are also more and more widely used, such as more detailed judgment of sound, long-distance sound monitoring and feature recognition, analysis and localization of surrounding sound sources, and then from audio signals. Dangerous features are extracted and integrated with video surveillance to improve the system's overall early warning capabilities.

In general, the background video server directly receives the front-end video signal for analysis. After the alarm is found, the alarm signal is transmitted to the remote host that receives the alarm through the network, and at the same time it is transmitted to other related equipment for alarm linkage to realize the image of the alarm scene. Force switch to the designated window of the management center or video wall. At present, the development technology of intelligent video analysis has made great progress, but because the development ideas and software functions are independent, no systematic application has been formed, resulting in a limited scope of application. The algorithm of abnormal behavior detection is high in complexity, and the accuracy and speed of discrimination that can meet actual needs are still very small. In addition, video surveillance systems already have networked and distributed processing capabilities, and are sometimes limited by capacity and power consumption during system construction.

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4. Functional Requirement Analysis and Overall Scheme Design of Regional Technical Defense Network Monitoring System Construction

The regional technical defense network video surveillance system to be constructed this time is a set of digital high-definition network surveillance systems, which are deployed in colleges and universities and adopt all-digital video network transmission, storage and control. The monitoring system is planned to use a network high-definition camera, and digital links are used for signal transmission, control, management and storage to realize real-time dynamic monitoring of key areas.

4. 1 System Functional Requirements

The system construction requirements are mainly to provide clear videos and pictures in terms of business analysis, security assurance and forensics; the monitoring staff controls the zoom of the cameras in the area, the horizontal and vertical orientation of the gimbal by operating the computer, and Collect video and store video information on the server in each monitoring scenario; the video monitoring system management platform can integrate the network layer protocols of each system to provide other APIs with rich API standard interfaces; other application systems completely remove the front-end video The collection of product APIs depends on the interface layer provided by the video surveillance system, which makes it possible to extend the image information of the video surveillance system to multimedia application systems such as office automation. In order to meet the needs of the development and unified management of the industry, this video surveillance system uses advanced full high-definition (1080P) IP cameras and IP integrated security management and control platform+IPSAN storage video surveillance system to build hundreds of high-definition cameras[7]. The key is the construction of a 1P integrated security management platform, which needs to adapt to the current 200-channel 1P video management and control, and also to meet the long-term(500 channels or more in the future)management and control needs.

Digital video surveillance management system requires the realization of image, sound, data transmission and sharing on audio and video application systems. The network protocol of the whole system adopts the requirements of the standard TCP/IP protocol and transmission standards in order to facilitate the resource invocation and system integration of the upper-level business system, so as to realize the image, data transmission and sharing on the network system. At the same time, the use of computer video processing technology can provide an open interface for access control, video alarm and other application systems to achieve system heterogeneity and integration. Whether it is secondary mining analysis or system management, the surveillance video in the network environment can have more application modes, improving work and management efficiency. In the case of saving manpower and material resources, it meets the requirements of various applications and maximizes the benefits of the system.

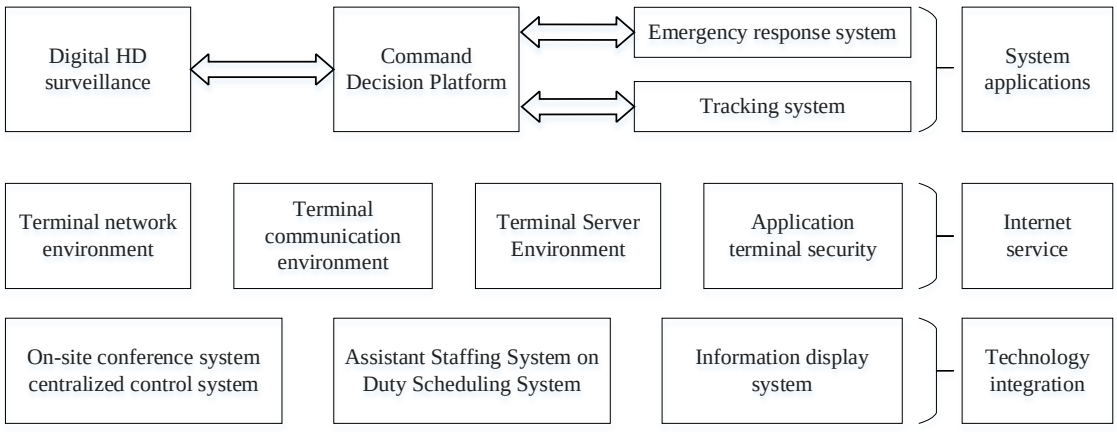

Figure. 1 System Functional Block Diagram

The video surveillance management system is completely based on computer networks and IP video terminal equipment. The modular 1P intelligent capture device can extend the tactile sense of video capture to every corner

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touched by the network, leaving ample room for future expansion. As shown in Figure 1, according to business needs, corresponding application modules can be installed in various subsystems to achieve the full use of network resources. From the front-end equipment, functional modules to the planning of the software system, all parts of the entire system have the capacity to expand and upgrade. The video equipment of the video surveillance management system uses a modular 1P intelligent acquisition unit, which leaves sufficient room for future expansion. The system software standard API interface makes it possible to be compatible with various brands and multiple compression formats of video capture equipment. The system also reserves interfaces for new digital equipment and compression formats, so that system upgrades and expansions can better meet the actual needs of users.

4. 2 System Function Implementation Process

Real-time supervision and implementation. The high-definition digital surveillance camera has a built-in high-definition compression algorithm, which realizes the 1080P encoding format. The camera's built-in microphone can encode and synchronize the audio signals of the surrounding environment and the video for synchronous transmission.

Real-time service implementation process:First, the digital high-definition camera and its built-in encoding device perform handshake communication with the built-in front-end point registration information of the video management device after power-on self-test; after the registration information is successfully compared, the front-end surveillance camera The inspection information is reported to the management device regularly. Second, the video information picked up by the digital high-definition camera is encoded into high-bandwidth, high-resolution(1080P format)video stream data through the built-in encoder, and is transmitted in the form of multicast or unicast according to the on-demand requirements of the back-end platform Into the network. After receiving the video stream, the media processing server copies and forwards it. Finally, with the authorization of the digital video matrix, the HD video decoder can decode the video stream data sent to the local, and then switch control through the digital video matrix, responsible for HD video display. At the same time, the network multicast video stream provides real-time display for network users through a dedicated client. The other storage stream is directly connected to the storage device and used for remote call, search and backup by network clients in the future.

Rotary cutting and its realization. The round-cut service is a service that takes turns to view and switch multiple real-time videos. The service implementation process:First, the video processing unit unicasts the corresponding surveillance camera video stream according to the switching and video configuration of the video management device, and then the digital video matrix The video image is switched and displayed. The display time can be set in advance or periodically cycled according to the system default of 5 seconds.

Storage and its implementation. In order to play back, search, retrieve and analyze the historical video, it is necessary to store the real-time video of each surveillance camera. First, according to the system capacity and the application environment, the storage unit is configured through the video data management server, including parameters such as storage plan, storage resources, and storage method. Secondly, after powering on the surveillance camera, the video management device server reads the camera storage plan pre-configured by the data management unit and passes these instructions to the front-end camera. The digital HD camera then sends the encoded video stream data to the SAN storage address according to the destination address provided by the data management unit. Finally, after the media stream data is stored, the accompanying video remarks are stored together as media stream retrieval information. The data management unit periodically checks the retrieval information in the storage unit and records it in the database of the video data server. Used as a search directory for later queries.

Playback service and its implementation. Firstly, the network client notifies the video management service and obtains the registration number after it is turned on. Secondly, according to the needs of business work, the client specifies which historical surveillance video of the HD surveillance camera to watch. Then the client retrieves the storage directory information of the front-end camera from the video data management server through the network, and after querying the database record information, informs the network client of the media stream data directory of the historical time period. Finally, the client submits an application for network playback to the video management server according to the returned video catalog information. After receiving the application, the video management server assigns the client permission to read and store data, so the client calls the corresponding historical video in the storage server Resources for on-demand playback. During the playback of historical video resources, users can perform regular editing operations.

System Multi-Screen Display Service. on the Monitoring System Network Client, Multi-Screen Live Video

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Can Be Displayed, and Each Screen Can Be Operated Independently.

Unified system time. A unified time standard is very important for digital high-definition systems to carry out real-time monitoring and historical retrospective retrieval. Therefore, the network time server is expensive. It also configures the time synchronization of various devices in the network of the system. At the same time, each subsystem in the network also performs time calibration with the time server. . For example, during some devices'self-test or synchronous update through network group call signaling.

5. Conclusion

This paper summarizes and analyzes the key technologies and development trends involved in digital high-definition monitoring systems, combined with the needs of college security in actual work, and makes functional requirements for the improvement of high-definition monitoring systems in college applications. In order to explore the application of digital high-definition monitoring technology, specific business processes are proposed in a more comprehensive and comprehensive way, hope that can provide ideas for improving the level of campus monitoring in actual work.

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