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Applications Research of Wireless Video Transmission Technology in Security Monitoring

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Abstract: With the development of monitoring industry from full analog monitoring to full digital monitoring system, monitoring transmission technology has also experienced from closed-circuit television transmission to IP wired network transmission. The security monitoring system based on wireless video is intuitive in form and rich in content. Wireless video intelligent monitoring and control part and display and recording part are applied in many places of society. Through the control operation of the camera host, the image captured by the camera is collected and sorted, and the image is input, stored and replayed through specific processing mode. Moreover, video intelligent analysis technology can greatly improve the efficiency of security monitoring and realize the unattended automatic security monitoring system. Gradually moving towards digital network development, the efficiency has been greatly improved and the security has been greatly enhanced. As an indispensable part of digital security system, wireless video transmission technology has become a powerful tool for modern management.

1. Introduction

With the rapid development of computer communication technology and network technology, wireless network technology has become a vital part of computer network [1]. Video surveillance data transmission is realized by mobile communication network, wireless local area network and wireless metropolitan area network. With the rapid development of security industry and the increasing scientific and technological content, the original simple security patrol officers take turns on duty day and night to use a variety of sensors, monitoring instruments and other tools to monitor duty [2]. According to the actual needs, monitoring facilities are installed in the entrance and exit, computer room, office area and other locations, and integrated with the current advanced video monitoring technology, network technology, security technology, etc. to build a sound video security monitoring system [3]. Its easy installation, flexibility, and cost-effective features enable more monitoring systems in the industry to use wireless monitoring to establish a connection between monitored points and monitoring centers. Not only can the wireless monitoring terminal be quickly armed, but also the real-time monitoring screen can be intelligently analyzed. Intelligent video analysis technology enables real-time monitoring. The streaming mode divides multimedia files such as video and audio into a compressed package through a special compression method, and the server transmits the data to the user computer continuously and in real time. One of the key technologies of the target process is the communication transmission of video, and the function of realizing the wireless communication transmission of video involves the video acquisition, compression coding, network packet transmission and remote reception of the embedded system [4].

Under wireless video transmission technology, streaming media multiple access broadcasting



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technology can ensure that users with different connection rates can get corresponding quality media playback effect, which can significantly reduce server load and maximize bandwidth savings. It is expected that by configuring appropriate embedded processor terminals as servers for monitoring the scene and using common smart phones as mobile intelligent terminals (clients) for remote monitoring, dynamic real-time mastery can be achieved at any time and anywhere [5]. In many cases, users are often limited by geographical environment and work content, which brings great inconvenience to the wiring project of wired network and wired transmission. Wireless intelligent video surveillance alarms within seconds when it confirms that it is not a false alarm. Really achieved unattended security monitoring [6]. To achieve various audio and video information collection, transmission, processing, display, storage and playback functions, and further through the connection with the computer network system, to achieve data, voice and image integration and sharing. Using wireless video transmission technology to transmit audio and video signals has become possible [7]. Therefore, wireless transmission has been applied to the video surveillance industry. Through the method of dynamic bit allocation and dynamic subchannel allocation, the subchannel with high signal to noise ratio is fully utilized, thereby improving system performance and increasing data transmission rate. Transmission wirelessization breaks the unfavorable situation that traditional coaxial cable and optical fiber image surveillance are subject to hardware connection, and has greater flexibility and convenience. Video security monitoring based on wireless network has emerged [8].

2. Materials And Methods

With the in-depth study of wireless video transmission technology, real-time transmission protocol based on protocol is generally used in the network video surveillance system. Only by choosing the appropriate multimedia network transmission protocol can we guarantee the performance requirements of less packet loss, less delay and high reliability in the process of data transmission. This is the common language basis of computer communication and also the realization of real-time. Because of the asymmetry of video surveillance services, for example, the amount of data transmitted in the upstream link between AP and video acquisition equipment is much larger than that in the downlink. The peripheral alarm circuit uses acousto-optic alarm. The intelligent analysis server analyses the video picture and drives the peripheral circuit to alarm. Avoid obstructions reasonably. To achieve wireless transmission in a special environment, it requires professional wireless transmission products, excellent product characteristics and rich experience in link planning and design. Adding a device simply means an expansion of the IP address, and a simple structure can form a large multi-level monitoring network. A server is an application that provides services to a request made by a client and returns a response. Intelligent security systems that use a variety of digital monitoring instruments not only reduce security personnel, but also greatly improve accuracy and reduce crimes caused by security personnel's negligence.

The purpose of signal transmission on reliable channel is to make full use of the bandwidth resources of the channel. For unreliable channel, the emphasis of transmission research is to make full use of the bandwidth resources to achieve reliable transmission. Through wireless network transmission to the monitoring center, so as to achieve all-weather monitoring of transmission lines and environmental parameters. Relevant personnel can watch live images in real time through the monitoring center or mobile phone. The monitoring center connects people to Internet through the Ethernet network, and receives data transmitted through wireless networks such as video surveillance system, access control system, patrol system, etc. Within the Internet, the transmission of information is not a constant stream. In the process of image transmission, the underlying layer of the Internet divides the data into multiple packets for transmission. The increase of surveillance cameras is mainly due to the increase of remote monitoring points in the front end, which is identified by IP address. Based on these principles of IP network transmission, network video surveillance has a great dependence on the network. The image receiver receives the image signal sent from the front end of the control and demodulates to restore the video signal to the hard disk recording system. When the monitoring points are dispersed and far away from the monitoring center, or the monitored objects are

not fixed, the video monitoring objects using the traditional wired network are often costly and difficult to implement. The mobile video surveillance based on multiple wireless transmission means realizes the irreplaceable advantage by sending the network interface to the corresponding customer and responding to the customer's interaction request to ensure the continuous output of the video stream.

In the field of wireless video surveillance, the impact of 4G network technology is very important. Wireless mobile monitoring is a branch of network monitoring, and the pressure of network transmission is more prominent. In the server side of wireless video intelligent monitoring system, embedded camera is used to collect video images in real time. The collected video images are processed by image processing such as human body recognition, and the sending process of monitoring video is selected according to the set intelligent processing mechanism. The sender can choose to retransmit the whole error data and check codes, or send the check codes with stronger error correction ability, which can be adjusted according to different control strategies. Network switching equipment supports multicast function, streaming media data is transmitted in the form of multicast in the network, which can reduce a certain number of forwarding servers and reduce the transmission pressure of the backbone of the network. The illumination adaptive module implements the processing of the illumination changes in the monitoring area. When the illumination distance changes drastically or slowly, the adaptive module compensates the picture for light. The control section is the key part of the linkage between alarm and video recording. The IP network to transmit surveillance video does not make changes to the underlying protocol of the IP transport, given the special application requirements and special bandwidth usage. These limited network bandwidth resources are effectively utilized through upper layer transmission control mechanisms. Remotely control the camera at each position, change the camera angle, azimuth, lens focal length, etc., so as to achieve a large-scale observation and close-up of the scene. The parameters of the wireless video intelligent monitoring module are shown in Table 1 and Figure 1.

Table 1 Wireless Video Intelligent Monitoring Module Parameters.

	Target	Handle
Wireless Video Transmission	11.30	0.26
Intelligent Video Analysis	10.85	0.13
Light adaptation	11.23	0.19

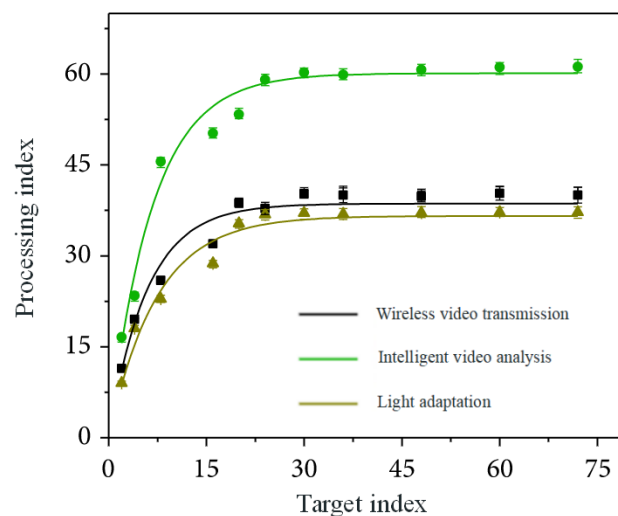


Figure 1 Wireless Video Intelligent Monitoring Module Parameters.

3. Result Analysis and Discussion

The software development environment of security monitoring server, which makes use of its concise and stable system environment, is conducive to the realization of customized professional needs. The selected high-speed ball should have the function of automatic aperture with quick response. Super wide dynamic backlight compensation, artificial intelligence white balance, dynamic movement detection function can make the image clearer, as well as fast and accurate zoom tracking, one-time automatic focusing and continuous automatic focusing function. Speedball can monitor all public places. At the same time, the control signal of the monitoring terminal is transmitted to the front section of the monitoring system to control the monitoring angle of the wireless camera. The centralized management platform completes the functions of centralized preview, control, management, storage, and video distribution of the entire video surveillance system, enabling centralized management of the entire HD network video surveillance system. When the network is overloaded, it automatically schedules data forwarding between them, reducing the burden and making full use of each upstream bandwidth. Network equipment usually works in idle offline mode, saving traffic, automatically networking when a variety of access control events occur and sending access control events to the monitoring center. An optimized end-to-end transmission mechanism is adopted in which the error recovery mode of each part is pre-determined by the encoding end according to the current channel condition and the error concealment algorithm used by the decoding end, and the decoding end decides to take error recovery according to the mode information.

The monitoring center plays the role of monitoring and dispatching, which mainly includes monitor, monitoring software, database server, alarm and dispatcher. In practical applications, because the channel error rate is closely related to the number of retransmissions, and each retransmit consumes a certain bandwidth, the bandwidth required to successfully transmit a data packet is related to the channel error rate. Use limited network resources. This mechanism can alleviate the pressure of the streaming media forwarding server, and can effectively alleviate the network transmission pressure of the front-end monitoring point without the streaming media forwarding server. By extending the wireless transmission distance by hopping, multi-hop can be used to achieve more long-distance data transmission, but multi-hop will seriously affect the transmission bandwidth, which requires professional technology to reduce bandwidth loss. The main camera sends commands to control the rotation of the platform and zooming of the lens from the camera, lock the target triggering the alarm and track it automatically, so that the target can be continuously enlarged to display in the center of the screen. The use of computer network technology enables related intelligent systems to interconnect, interoperate, and integrate information, realize digital application network convergence, achieve resource sharing, enhance functions, and reduce operating costs. During the real-time monitoring process, the client can implement related operations on the monitoring server through certain control commands. The operation of transmitting video over the wireless network can also be initiated first by the client, that is, the user's active instant video monitoring request is implemented.

Inter-frame prediction coding uses motion estimation and motion compensation, combines the motion compensation based on block with the motion compensation based on block, and chooses the appropriate reference macroblock and prediction mode to remove the time redundancy correlation of continuous pauses. Because the video signal has strong temporal and spatial correlation, and the coder can not completely remove this correlation, so the decoder can use these residual correlation to restore a certain quality of video. In addition, the wireless intelligent video surveillance center adopts the combination of fast snapping and timely photography, assisted by remote control, image processing, heating (anti-frosting of camera lens), historical data comparison, night vision (night shooting), environmental temperature monitoring, wireless transmission and other technologies to monitor the video surveillance signal in real time through the surveillance software, and make real-time video recordings, so as to record the case. It has been put on record. Users can make network connections anytime, anywhere, realizing ubiquitous monitoring and providing effective communication and monitoring tools for patrol personnel. The network port of the camera is directly connected to the intra-camera video transmission network, and transmitted to the back end for centralized storage and

management. The coded orthogonal frequency division multiplexing modulation is transmitted to the receiving terminal, the target recognition module filters the video information, and the intelligent video analysis module analyzes the picture that generates the preset alarm.

4. Conclusion

In this paper, the application of wireless video transmission technology in security monitoring is studied. Security monitoring server, and after the necessary digital video processing, through wireless network transmission to remote mobile phone monitoring client. Decision-making needs to start the video transmission process at all times to avoid blind video transmission. Moreover, it can achieve the comprehensive management of civil air defense, technical defense and material defense organically. The advantages of networked video surveillance system are more and more obvious. Its high openness, integration, security and flexibility create the necessary conditions for the improvement of the overall performance of video surveillance system and equipment. At the same time, it also provides a broader development space for the development of the entire security industry. In the design scheme, wireless video transmission technology can be used to achieve fast start-up, stable performance, easy to use, safe and reliable, and meet the needs of uninterrupted, long-term work and maintenance-free system. Reconstruction of distortion at the receiving end, due to the possibility of retransmission and post-processing recovery in the case of transmission errors, the final distortion will depend on the channel itself. The development of wireless video transmission technology has opened up a new situation for security monitoring.

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