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Coding and Decoding Optimization of Remote Video Surveillance Systems:
Consider Local Area Network

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ABSTRACT

In order to solve the problems of high distortion rate and low decoding efficiency of the decoded video when the current coding and decoding methods are used to encode and decode the remote video monitoring system, considering the local area network, research on the optimization method of the coding and decoding of the remote video monitoring system is proposed. The local area network is used to collect image information, to process, and to output the image information. By preprocessing the remote video monitoring system, the low frame rate remote video monitoring system is decoded in parallel. The motion information of the lost frame is estimated to realize the fast coding and decoding of the remote video monitoring system. The experimental results show that the proposed method has low distortion rate and high decoding efficiency and has high practical value.

KEYWORDS

decoder, Decoding distortion rate, Edge extraction, Remote video monitoring system, Wireless LAN,

INTRODUCTION

Remote video monitoring system is a comprehensive technology integrating multimedia image processing technology, network communication technology, automatic control technology and intelligent alarm technology. It is one of the important equipment to realize the automation of traction substation. Remote video monitoring system involves video compression standard selection, video acquisition, encoding / decoding, image real-time display, video error control and recovery, video equipment control and other video technologies, as well as network structure design, multi-threaded synchronous control, fault-tolerant coding, network protocol selection and other network communication technologies. With the emergence of 3D technology, high-definition technology and high-definition video (Liu, 2021), people have obtained richer visual experience (Yadav, 2021). HD video technology is widely used in various fields, such as HD video conference, video on demand and home video monitoring (Liddo et al., 2020). The amount of video data increases with the improvement of program source quality, and the bandwidth increases gradually in the transmission process. Video

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definition increases with the increase of temporal resolution and spatial resolution (Moghaddam et al., 2019). Under the above background, the parallel decoding method of remote video monitoring system has become a research hotspot. At present, the parallel decoding method of remote video monitoring system has the problems of high video distortion rate and low decoding efficiency. It is necessary to study the parallel decoding method of remote video monitoring system (Chen et al., 2021).

Zhou adopts the software-based MPEG-4 (Moving picture expert group-4) compression coding method based on software is adopted, and a simple camera is used to realize real-time acquisition and wireless transmission of video signals. The self-developed ActiveX control is embedded in the web page, which has the function of video decoding to realize the real-time dynamic display of video information in the computer browser of the monitoring terminal. Secondly, in order to realize the intelligent control of wireless networks, the attitude planning based on reverse motion is studied. The linkage coordinate system of wireless network remote monitoring is established by DH parameter method, and the kinematics formula is deduced. The geometric analysis method is used to calculate the motion trajectory of remote monitoring, accurately locate each angle of remote monitoring, and obtain the best motion path. The permanent magnet angle control method based on fuzzy neural network combines RBF neural network, fuzzy control and permanent magnet control, and uses the self-learning ability and fuzzy reasoning ability of neural network to carry out fuzzy control. Adjust the end effector to the target position. Finally, the mathematical model is simulated by MATLAB to verify the characteristics of wireless network remote monitoring. Masuda et al. have proposed a three-dimensional magnetic recording technology using microwave-assisted magnetic recording and spin torque oscillator as reading sensors has been proposed as a candidate technology for future recording technology. The read / write channel of envelope model is constructed to evaluate various signal processing of three-dimensional magnetic recording. The low density parity check coding and iterative decoding system (including Turbo Equalization) is applied to the three-dimensional magnetic recording channel model with point position fluctuation, and its bit error rate performance is evaluated by computer simulation. Enyu et al. proposed a new TWDR selection scheme for joint decoding, partial decoding, bit level XOR and overlay coding schemes of bidirectional decoding and forward relay.

The above method has many calculation processes and is prone to decoding distortion. It can achieve the "error free" dot position fluctuation tolerance. However, the effect of application in remote video surveillance system coding and decoding is unknown. There are still limitations to improving the coding and decoding of remote video surveillance system. In order to solve the above problems, this paper proposes an improved codec optimization method of remote video surveillance system based on WLAN and video preprocessing. The pressure of operation management and maintenance of remote video monitoring equipment is increasing. In order to change the operation mode in time, steadily promote the construction of regulation integration, realize the visual operation of monitoring equipment and synchronous video monitoring of operation status in the regulation center, and further improve the safety and reliability of operation and maintenance under unattended conditions, a system focusing on improving remote video monitoring came into being. After the system is put into operation, it can meet the production requirements, improve the monitoring ability of the dispatch and control center to the area under its jurisdiction, greatly shorten the response time under emergency conditions, and improve the efficiency of accident handling.

In this paper, the LAN is used to collect, process and output the image information of the remote video monitoring system, and the overall structure of the system is designed. Through preprocessing the remote video monitoring system, the adaptive frame drawing method is used to decode the low frame rate remote video monitoring system in parallel. The motion information of the lost frame is estimated, and the bidirectional motion compensation frame insertion method is used to realize the fast coding and decoding of the remote video monitoring system. The key contributions of the paper are summarized as follows.

(1) The decoder of remote video surveillance system is optimized through LAN, and the parallel decoding algorithm of remote video surveillance system is designed on this basis;
(2) Combining WLAN with video preprocessing means to improve the encoding and decoding performance of remote video monitoring system;
(3) Realize the codec optimization of remote video monitoring system. Experiments show that the codec optimization performance of remote video monitoring system under this method is better.

OVERALL DESIGN

In order to realize the optimal design of encoding and decoding of remote video monitoring system based on Wireless LAN, the image acquisition of remote video monitoring system is realized by combining interface tools and Wireless LAN (Chen et al., 2020). Wireless LAN refers to the application of wireless communication technology to interconnect computer equipment to form a network system that can communicate with each other and realize resource sharing. The essential feature of WLAN is that it no longer uses communication cables to connect computers with the network, but connects them wirelessly, so as to make the construction of the network and the movement of terminals more flexible. The WLAN has the following characteristics:

(1) Flexibility and mobility. In wired networks, the placement position of network equipment is limited by the network position, and WLAN can access the network at any position in the wireless signal coverage area. Another biggest advantage of WLAN is its mobility. Users connected to WLAN can move and keep connected with the network at the same time.
(2) Convenient installation. WLAN can avoid or minimize the workload of network wiring. Generally, as long as one or more access point devices are installed, a local area network covering the whole area can be established.
(3) It is easy to plan and adjust the network. For wired networks, changes in office location or network topology usually mean focusing on new networks. Rewiring is an expensive, time-consuming, wasteful and trivial process. WLAN can avoid or reduce the above situation.
(4) Easy fault location. Once there is a physical failure in a wired network, especially the network interruption caused by poor line connection, it is often difficult to find out, and it needs to pay a great price to repair the line. The wireless network is easy to locate the fault, and the network connection can be restored by replacing the faulty equipment.
(5) Easy to expand. Wireless LAN has a variety of configuration methods, which can quickly expand from a small LAN with only a few users to a large network with thousands of users and can provide the characteristics that wired networks such as “roaming” between nodes cannot achieve (Saha et al., 2019). Because WLAN has many advantages above, it develops very rapidly. In recent years, WLAN has been widely used in enterprises, hospitals, stores, factories and schools.

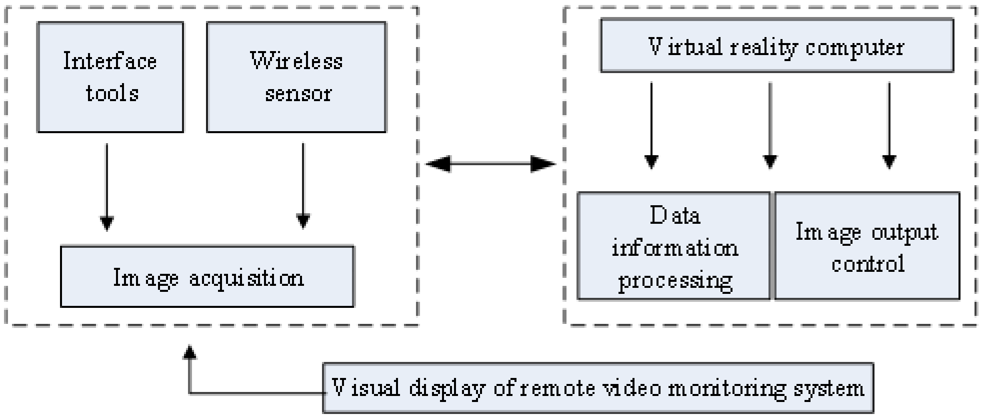
According to the above contents, the overall design framework of the system is shown in Figure 1.

According to the overall design framework of Figure 1, with the development and maturity of video compression technology, the coding and decoding optimization of remote video monitoring system gradually occupies an important position in the field of monitoring (Dawood et al., 2019). Realizing the coding and decoding of monitoring system provides a feasible method for the design of video compression transmission of actual embedded video monitoring system.

VIDEO PREPROCESSING

The design of remote video preprocessing is realized by using Wireless LAN. Under the Wireless LAN model, GNU under x86 is developed and video capture interface is set. At the same time, for

Figure 1.
Overall design framework of the system



embedded resource scheduling, set the serial port window value of the monitoring system according to the scheduling results, connect the JTAG interface, construct the asynchronous serial I / O output interface for intelligent monitoring of the remote video monitoring system, and complete the implementation process of video preprocessing, as shown in Figure 2.

Image Acquisition

Take the information of objects and open space in the video as the background information. When collecting the image information of the monitoring system, the background video information is transformed into a background index. The transformation process can be expressed as:

$$N_D = \frac{N_{IR} - R_{red}}{N_{IR} + R_{red}} \tag{1}$$

In formula (1), N_D represents the conversion index, N_{IR} represents the near-infrared band, and R_{red} represents the video red band. After conversion, the background index is extracted, the spectral brightness value on the background index of the video image is processed by spectral tool, the obtained pixel values are represented by bands 1 ~ 3, and different types of sample areas are established. According to the changes of pixel values in different sample areas, the object spectral mean curve in the video frequency is obtained.

It can be seen from the change of object spectral mean curve in Figure 3 that the corresponding spectral curves of band 1 and band 2 regions are parallel, and the images corresponding to the two band regions are taken as the mining object, and the shape index of the image is obtained according to the wavelength value and pixel value in the spectrum with the aspect ratio, elongation, shape index, compactness and fine length of the image as the image features, The shape index can be calculated as: f_y

$$F = \frac{\sqrt{A}}{P} \times N_D \tag{2}$$

Figure 2.
Flow chart of video preprocessing

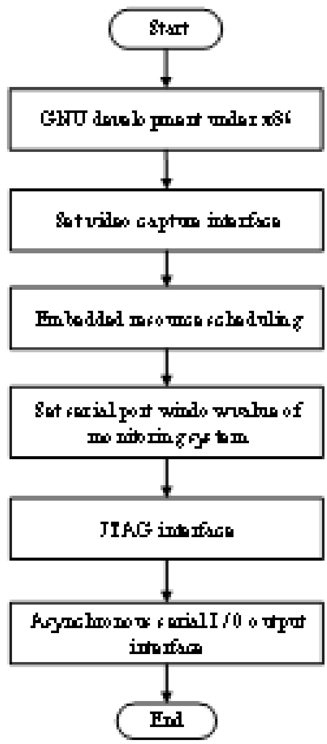
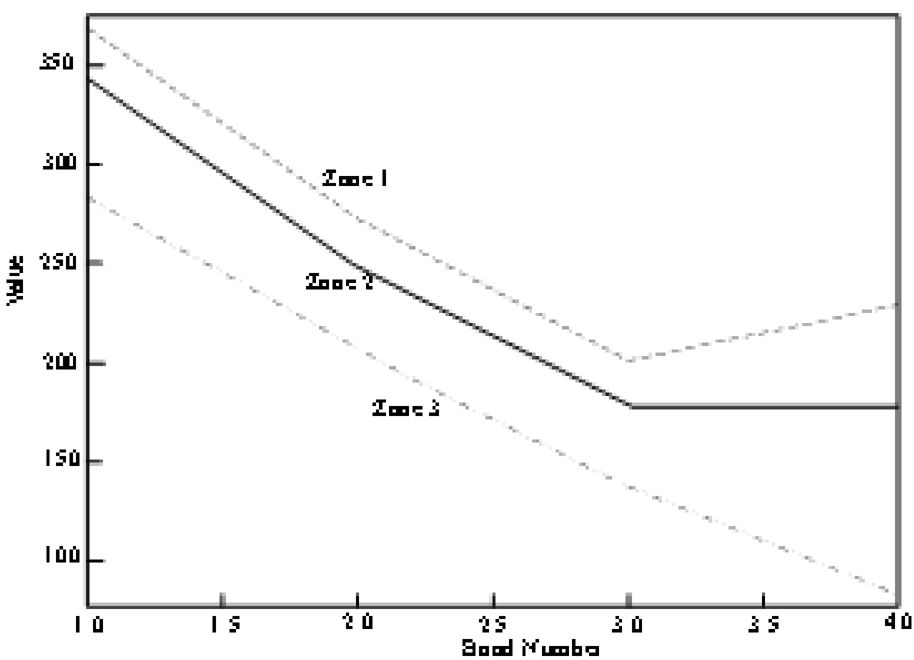


Figure 3.
Variation of spectral mean curve



In formula (2), F represents the shape index, A represents the area of the image, and P represents the perimeter of the image. Under the control of shape index, the calculation formula of fine length of image is constructed:

$$L = \frac{I^2}{A} \times F \tag{3}$$

In formula (3), L represents the fine length of the image, I represents the length of the centerline, and the meaning of other parameters remains unchanged. The elongation coefficient of the image is calculated according to the angle between the calculated slender value and the video horizontal plane. The calculation formula can be expressed as:

$$S = \arctan \sqrt{f_x^{\,2} + f_y^{\,2}} \times L \tag{4}$$

In formula (4), f_x represents the included angle of the slender value in the x-axis direction, and represents the included angle of slender value in the y-axis direction. The obtained elongation coefficient is used as the projection of the image on the video image, so the compactness value of the image can be expressed as:

$$A = \frac{r - \arctan f_x}{\frac{r}{2} - \arctan f_y} \times S \tag{5}$$

In formula (5), r represents the elevation change rate of the image, and the meaning of other parameters remains unchanged. After mining the above image feature information, preprocess the video monitoring image.

In order to meet the actual production needs of the image acquisition center, the key technologies of the coding and decoding optimization of the remote video monitoring system are studied, and the optimization scheme is designed. After the scheme is put into operation, it can meet the actual needs, improve the monitoring ability of the dispatch and control center, greatly shorten the response time under emergency conditions, and improve the efficiency of accident handling.

Edge Extraction and Spatial Smoothing

The codec optimization method of remote video monitoring system based on Wireless LAN extracts the edge of remote video monitoring system through Sobel operator, divides remote video monitoring system according to the extracted edge, obtains non edge area and edge area, and get edge extraction $F(k,j,i)$. the specific process is as follows:

The Sobel operator is used to extract the edge video $G(K,H,W)$ existing in the remote video monitoring system. Let $G(k,j,i)$ represent the edge gradient value of the pixel points in column i, row j and frame k in the original video $D(K,H,W)$, and its calculation formula is as follows:

$$G(k,j,i) = \alpha \sum_{m=j-i}^{j+1} \sum_{n=i-1}^{i+1} D(K,H,W) \times G_x + \beta \sum_{m=j-1}^{j+1} \sum_{n=i-1}^{i+1} D(k,m,n) \times G_y \tag{6}$$

In formula (6), α represents the weight factor corresponding to the edge gradient in the horizontal direction; β represents the weight factor corresponding to the edge gradient in the vertical direction; $D(k,m,n)$ represents the depth value corresponding to the pixel points of column n, row m and frame k in the original video $D(K,H,W)$; G_x, G_y represents the convolution kernel corresponding to the depth value $D(k,m,n)$ in the horizontal and vertical directions, and its calculation formulas are as follows:

$$G_x = \begin{bmatrix} -1 & 0 & 1 \\ -2 & 0 & 2 \\ -1 & 0 & 1 \end{bmatrix} \tag{7}$$

$$G_y = \begin{bmatrix} -1 & 2 & -1 \\ 0 & 0 & 0 \\ 1 & 2 & 1 \end{bmatrix} \tag{8}$$

According to the edge gradient value $G(k,j,i)$ of the $G(K,H,W)$ pair edge mask $F(k,j,i)$ obtained in formula (6), if the value of the edge gradient value $G(k,j,i)$ is not zero, it indicates that the edge mask $F(k,j,i)$ corresponding to the pixel point is 1, if on the contrary, the edge mask $F(k,j,i)$ is 0:

$$F(k,j,i) = \begin{cases} 1 & if\, G(k,j,i) \neq 0 \\ 0 & if\, G(k,j,i) = 0 \end{cases} \tag{9}$$

The original video $D(K,H,W)$ realizes spatial smoothing through the edge mask $F(k,j,i)$ (Zimmermann et al., 2019), and the specific steps are as follows:
Step 1: Count the total number of pixels in Block $B_{(2\times2)}$: when the value of edge mask $F(k,j,i)$ is 1, the total number of pixels in block $B_{(2\times2)}$ is $c+1$.
Assign marked pixel points $f(k,j,i)$: if the total number c of edge pixel points in Block $B_{(2\times2)}$ is more than 1, set the value of $f(k,j,i)$ to $true$; on the contrary, set the value of $f(k,j,i)$ to $false$:

$$f(k,j,i) = \begin{cases} true & if\, c > 1 \\ false & if\, c \leq 1 \end{cases} \tag{10}$$

Assign values to the pixels existing in block $B_{(2\times2)}$: if the value of $f(k,j,i)$ is $true$, it indicates that the values of all pixels in block $B_{(2\times2)}$ are 1; If the opposite is true, the values of all pixels in the $B_{(2\times2)}$ block are 0 (Smolka et al., 2020):

$$B_{(2\times2)} = \begin{cases} 1 & if\, f(k,j,i) = true \\ 0 & if\, f(k,j,i) = false \end{cases} \tag{11}$$

Spatial smoothing is realized by the following formula:

$$D'(k,p,q)=\begin{cases}\frac{1}{4}\sum_{m=j}^{j+1}\sum_{n=i}^{i+1}D(k,m,n) & if\,B_{(2\times 2)}=1\\ D'(k,p,q) & if\,B_{(2\times 2)}=0\end{cases} \tag{12}$$

In formula (12), $D'(k,p,q)$ represents the depth value of column q, row p and frame k of the initial video $D(K,H,W)$ after spatial smoothing.

On the basis of the current operation situation, combined with the application requirements of edge extraction and airspace smoothing, the construction of remote video monitoring system should achieve standardized and unified interfaces and open access to the original security remote viewing system; Realize the integration of video monitoring, fire alarm and environmental monitoring in the station end system (Xie et al., 2019); It can provide business oriented application development interface, and provide auxiliary technical means and system support for power grid operation management, daily monitoring and fault handling; It is open and convenient for system distributed construction and deployment.

VIDEO FAST PARALLEL DECODING METHOD

Adaptive Frame Extraction Method at Coding End

The encoding and decoding optimization method of remote video monitoring system based on Wireless LAN increases the sequence scene in the video through the adaptive frame extraction method, and extracts the number of frames without jump, so as to reduce the amount of transmitted data and the number of coded frames (Mahadevan et al., 2021). The adaptive frame drawing method at the coding end has good compatibility, scalability and reliability, and is flexible in application. Its coding is object based, which is easy to operate and control (Venkatesan et al., 2021). Using the rate allocation method, the quality of video images is guaranteed, which is suitable for different transmission bandwidths, different image sizes and resolutions, and supports a variety of multimedia applications.

Judge whether a frame is a scene jump frame through the relative change rate R and average absolute error $MSAD$ of adjacent frames, and its expressions are as follows:

$$R=\frac{|M_{SADi+1}-M_{SADi}|}{|M_{SADi+2}-M_{SADi+1}|} \tag{13}$$

$$M_{SAD}=\frac{\sum_{i=0}^{m-1}\sum_{j=0}^{n-1}|f_i(i,j)-f_{i-1}(i,j)|}{m\times n} \tag{14}$$

In formula (13) and (14), m represents the width corresponding to the remote video monitoring system; n represents the height corresponding to the remote video monitoring system (Xu et al., 2019); $f_i(i,j)$, $f_{i-1}(i,j)$ represents the pixel values corresponding to the current and previous reference frames at position (i,j).

Missing Frame Motion Estimation

Let t represent the current time frame; $t-\Delta t$ represents the forward reference frame. When the blocks in the current frame find the best matching block, the motion estimation process is divided into forward and backward motion estimation to obtain the motion vector (Dash et al., 2019). The initial motion vector estimation method of bidirectional motion compensation interpolation frame and lost frame is as follows:

$$F_t(x,y) = \frac{R}{2}(F_{t-1}(x+\bar{V}_x, y+V_y) + F_{t+1}(x-\bar{V}_x, y-V_y)) \tag{15}$$

In formula (15), $(\bar{V}_x, \bar{V}_y)$ represents the initial motion vector position corresponding to the frame to be inserted relative to the previous reference frame; (V_x, V_y) represents the motion vector position corresponding to the front reference frame of the frame to be inserted in the code stream relative to the rear reference frame (Wang et al., 2019); $F_t(x,y)$ represents the reconstruction value corresponding to the frame to be inserted at position (x,y); F_{t+1} represents the reference frame of the current frame; F_{t-1} represents the reference frame of the previous frame.

Bidirectional Motion Compensation Frame Insertion Method

The motion vector filling process of intra block in the frame is as follows:

$$M_{V\,intra} = \frac{\omega_1 M_{V1} + \omega_2 M_{V2} + \cdots + \omega_n M_{Vn} + M_{V\,prev} + M_{V\,back}}{\omega_1 + \omega_2 + \cdots + \omega_n} \tag{16}$$

In formula (16), $M_{V\,intra}$ represents the estimated value corresponding to the motion vector in the frame; $M_{V\,prev}$ represents the motion vector corresponding to the same inner block of the previous reference frame and the current reference frame in the frame to be inserted; ω_i represents compensation weight; M_{Vi} represents the motion vector of adjacent blocks; n represents the total number of adjacent blocks; $M_{V\,back}$ represents the motion vector of the intra block at the same position of the current reference frame and the next reference frame.

Smooth the motion vector by:

$$M_V = \frac{\sum_{k=1}^{N} M_{V\,intra}}{N} \tag{17}$$

Due to the rapid development of LAN and the change of power grid operation mode, the functions of the original security remote viewing system cannot meet the requirements of development. In order to strengthen management, realize the visual operation of the encoding and decoding equipment of the remote video monitoring system and the synchronous video monitoring of the operation state, ensure the reliability of remote control operation and the timeliness of accident emergency treatment, the construction of the remote video monitoring system is imminent. In addition, detailed analysis is made from the aspects of adaptive frame extraction at the coding end, motion estimation of lost frames and bidirectional motion compensation frame insertion of the remote video monitoring system construction, which points out the direction for the design of the system's coding and decoding optimization. Through the above process, the coding and decoding optimization of the remote video monitoring system is realized.

SIMULATION EXPERIMENT ANALYSIS

Experimental Target Image

The image data of this experiment comes from the computer vision image database, which contains surveillance video and surveillance images. The resolution of the test image is 640 * 480. The test picture is shown in Figure 4.

This experiment uses matlab software as the carrier, in which 100 remote videos are imported to reduce the manpower and material resources consumed in the process of monitoring video capture and provide experimental efficiency. This part of videos are from a company. The experimental video contains a large number of surveillance images with different shapes and backgrounds. In order to better use this part of the video to complete the experimental process, the video definition statistics is set to 1080 frames. According to the types of some videos, they are divided into 5 categories. The classification results of the experimental video set are shown in Table 1.

After image division, use boxes to label the images in the video. According to the above annotation results, the application effect of the optimization method in this paper is objectively evaluated. Use the above videos of the detector for mixed processing, and randomly select 30 videos as the training group, and the rest as the test group.

Experimental Preparation

Prepare a light sensor with known parameters. The sensor parameters are shown in Table 2: under the control of various parameters shown in Table 2, configure a CPU with memory of 4GB and 4.0ghz, use the computer of windows 10 system, use Visual C + + 9.2 to obtain video monitoring image parameters, and use opencv 2.4 3 as the parameter realization tool, Matlab is used as the development tool.

Figure 4.
Test sample

Table 1.
Classification results of experimental video set

Experimental video group	Number of videos	Video Type
1	15	Proximity image
2	20	Distant image
3	16	Character image
4	14	Item Image
5	25	Overall image

Analysis of Experimental Results

In this experiment, the main research content is to improve the codec packet loss rate, video distortion rate and decoding time of the remote video monitoring system. The overall experimental codec optimization result is expressed by the packet loss rate, and its calculation formula is set as follows:

$$E = \frac{a}{a_0} \times 100\% \tag{18}$$

In formula (18), a_0 represents the edge of the remote video that has been captured in advance; a represents the detected edge image. The application effect of the optimization method is determined through the fusion analysis of the above three indicators. Before the experiment, the packet loss rate of the platform is taken as the experimental result, and the packet loss rate of the designed decoder shall not exceed 0.1%. The practicability of the designed decoder is verified by comparing the packet loss rates of the methods in this paper, diffiehellman parameter method and dot position fluctuation method. The comparison results are shown in Table 3.

It can be seen from Table 3 that the designed decoder loses less data in the process of data transmission, and the packet loss rate is basically between 0.008-0.025%, while the packet loss rate of diffiehellman parameter method and dot position fluctuation method are between 0.103-0.574%, which is much higher than the packet loss rate of the designed decoder. The test results of decoder

Table 2.
Preparation sensor parameters

Serial number	Name	Parameter value
1	Schema name	Pixel array
2	Output form	Parallel analog output
3	Sampling speed	50 million times
4	Pixel throughput	5 billion
5	Image quality accuracy	10 bits
6	Data throughput	55Gbit
7	Working speed	5000 frames /s
8	Frame rate	170000 frames
9	Analog to digital conversion	10 bits
10	Symbolic AD converter	10 bit redundancy

Table 3.
Comparison of packet loss rate

Data transmission volume/TB	Diffiehellman parameter method	Dot position fluctuation method	The proposed method
2	0.125	0.122	0.025
4	0.124	0.123	0.014
6	0.136	0.103	0.009
8	0.124	0.111	0.013
10	0.125	0.129	0.011
12	0.246	0.189	0.016
14	0.269	0.124	0.011
16	0.458	0.158	0.009
18	0.574	0.154	0.008
20	0.369	0.129	0.012

packet loss rate show that the remote video monitoring system based on Wireless LAN can effectively ensure the effective transmission of data and has high security.

In the process of improving the coding and decoding of the remote video monitoring system, there will be problems such as data loss, noise interference of the transmission channel, and digital asynchrony, which affect the efficiency of coding and decoding optimization. The distortion rate represents the degree of variation of the actual improved remote video monitoring signal relative to the ideal signal, which is a relative ratio. The lower the distortion rate is, the higher the efficiency of the codec optimization is, and the better the performance is. Taking Figure 4 as the test sample, experiments are carried out using the methods in this paper, diffiehellman parameter method and dot position fluctuation method, and the video distortion rates of three different methods are compared. The test results are shown in Figure 5.

It can be seen from Figure 5 that the video distortion rate of the Wireless LAN based remote video monitoring system codec optimization method is lower than that of the methods in diffiehellman parameter method and dot position fluctuation method in many iterations, because the Wireless LAN based remote video monitoring system codec optimization method performs edge extraction, spatial smoothing and space-time conversion on the video before video decoding, The distortion rate of video is reduced.

The Wireless LAN based remote video monitoring system codec optimization method, diffiehellman parameter method and dot position fluctuation method are used to test respectively. The decoding time of the three methods is compared. The test results are shown in Figure 6.

By analyzing Fig. 6, it can be seen that the decoding time of the Wireless LAN based remote video monitoring system codec optimization method is less than that of the diffiehellman parameter method and dot position fluctuation method, because this method uses the bidirectional motion compensation frame insertion method to realize the fast parallel decoding of the remote video monitoring system on the basis of the h265 coding standard, which shortens the time required for video decoding, It improves the decoding efficiency of the codec optimization method of remote video surveillance system based on Wireless LAN.

DISCUSSION

The remote video monitoring system is a digital and networked monitoring system. All devices in the system communicate with each other through IP network. In addition, the system can use efficient image encoding and decoding technology and embedded design, and can provide high-definition

Figure 5.
Video distortion rate of three different methods

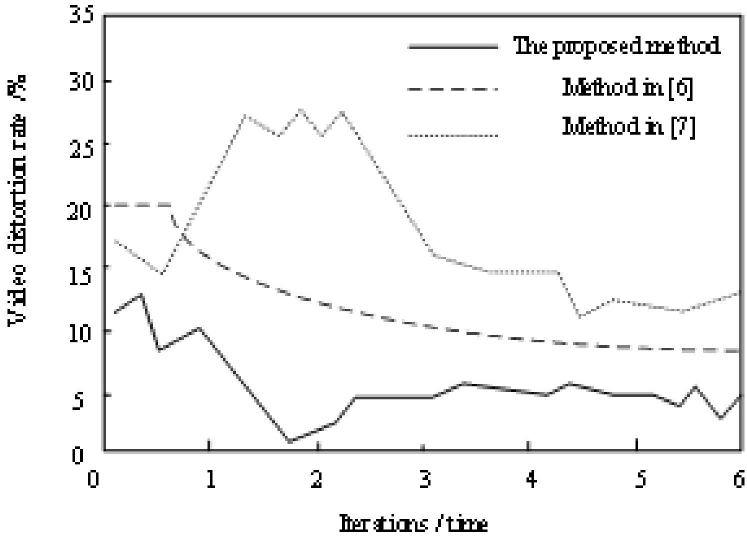
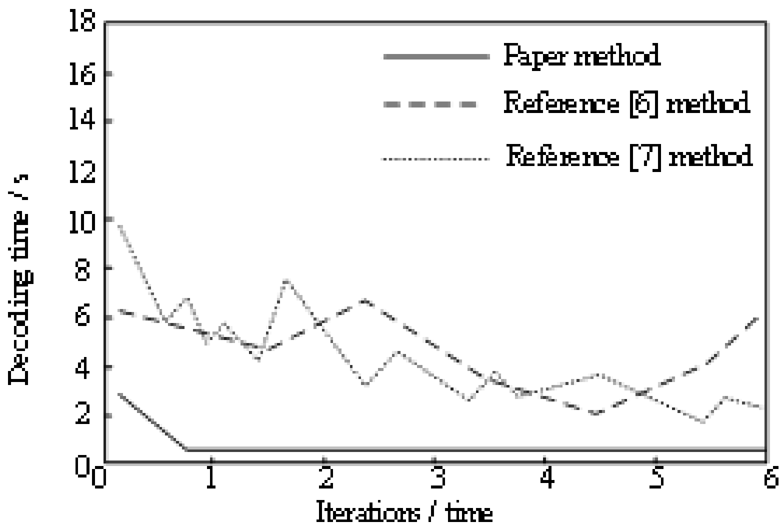


Figure 6.
Decoding time of three methods



monitoring images, software video and audio switching, video recording and playing, remote control, remote signal acquisition, whole process centralized control and other functions.

(1) The point-to-point encoding and decoding method is used to transmit the monitoring image, or the centralized monitoring method can be used. Provide a PC/server based software architecture center service platform, as well as an embedded, modular hardware architecture center service platform to

flexibly adapt to different networking and application needs. All software modules can be configured and cut and can be arbitrarily distributed on different operating systems and different hardware.

(2) The system has a variety of operation level user management modes, such as centralized management, hierarchical management, and direct acceptance by the business hall. The system is based on an open design system, with extensive compatibility and late scalability.

(3) The system can ensure the security of the whole network in many ways. The security of the platform itself can avoid the security risks based on Windows, Linux and other general operating systems by using the embedded hardware platform, and it has a wide range of good effects and great use value in various fields.

CONCLUSION

Video compression is the premise of all video services. The encoder reduces the storage cost and transmission cost of the original video. The compressed data is converted into the original video through decoding in the video processing process, making the parallel decoding method of remote video monitoring system a research hotspot. In order to solve the problems of high video distortion rate and low decoding efficiency in current parallel decoding methods of remote video monitoring systems. This paper proposes a research on the coding and decoding optimization method of improved remote video monitoring system based on the fusion of wireless LAN and video preprocessing means, and draws the following conclusions:

(1) The decoder of this design method loses less data during data transmission, and the packet loss rate is basically between 0.008-0.025%, which can effectively ensure the effective transmission of data and has high security.

(2) An improved coding and decoding optimization method based on the fusion of wireless LAN and video preprocessing means for remote video monitoring system reduces the video distortion rate.

(3) The research method can complete the decoding of remote video monitoring system with high quality in a short time, laying the foundation for the development of video decoding technology.

To sum up, under the integration mode of wireless LAN and video preprocessing means, the functions of the control center have changed. On the basis of the operation management of the encoding and decoding optimization method, the monitoring of remote video operation equipment has been increased. Therefore, it is very necessary to carry out the construction of remote video monitoring system to assist the dispatch and control center to perform tasks. This method solves the problems of high video distortion rate and low decoding efficiency when the current encoding and decoding methods are used to encode and decode the remote video monitoring system.

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CONFLICTS OF INTEREST

The authors declare that they have no competing interest.

DATA AVAILABILITY STATEMENT

The data used to support the findings of this study are included within the article.

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