

## *Retraction*

# **Retracted: Research on Architecture Design of Mobile Video Surveillance System in Information Room Based on Intelligent Robot Technology**

### **Wireless Communications and Mobile Computing**

Received 28 November 2023; Accepted 28 November 2023; Published 29 November 2023

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This article has been retracted by Hindawi, as publisher, following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of systematic manipulation of the publication and peer-review process. We cannot, therefore, vouch for the reliability or integrity of this article.

Please note that this notice is intended solely to alert readers that the peer-review process of this article has been compromised.

Wiley and Hindawi regret that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

### **References**

- [1] T. Wen, "Research on Architecture Design of Mobile Video Surveillance System in Information Room Based on Intelligent Robot Technology," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 6479000, 7 pages, 2022.

## Review Article

# Research on Architecture Design of Mobile Video Surveillance System in Information Room Based on Intelligent Robot Technology

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Received 4 July 2022; Revised 26 July 2022; Accepted 5 August 2022; Published 10 September 2022

Academic Editor: Hamurabi Gamboa Rosales

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With the gradual development of information technology, the idea of combining mobile robot and wireless remote control technology is adopted to build a wireless network platform between a computer and robot. At present, there are conditions to realize this idea. In this idea, the wireless data transmission can be realized on the platform. Users can remotely control and access the monitoring system of the computer room and set up alarm systems and detectors, so as to monitor the working conditions of the robot at the computer terminal, truly realize the man-machine coordination, and ensure that the robot can complete the specified tasks well in various complex environments. This research first deeply analyzes the current development status and existing problems of the information room monitoring technology and then puts forward the mobile video monitoring system architecture of the information room based on the intelligent robot monitoring technology. The system architecture integrates computer technology, network technology, and control technology. With the continuous updating of technology, video surveillance has also entered the mobile era. Combined with the timely monitoring video acquisition system of mobile robots, it solves the current working environment for many industries and enterprises. Using robot chassis technology, it designs the corresponding bottom hardware control and upper equipment to achieve data acquisition with related equipment. The mobile video surveillance system solves the problems encountered by the traditional video surveillance system and can monitor video images through remote operation and centrally monitors the operation status of the equipment in the room and the environmental status of the room, which is more conducive to improving the management efficiency. It provides a new idea to ensure the safe and stable operation of various equipment and systems in various places.

## 1. Introduction

In recent years, with the development of science and technology, the prevalence of wireless communication technology has brought us the convenience of getting rid of the limited cable and realizing accurate information transmission under wireless conditions. It is confirmed that we can exchange information through network resources or Internet equipment in our life and work. In practical work, intelligent robots often need to work under various complex conditions, and the traditional limited communication mode will obviously bring great obstacles to this process. Therefore, in order to get rid of the shackles of traditional cables and the rapid development of social informatization, people have established mobile moni-

toring systems through computer, communication technology, and other means to achieve the purpose of maintaining public security.

It has become a significant research to realize the combination of wireless communication and intelligent mobile robot. The wireless communication mode has the advantages of simple and convenient establishment, good applicability, and sufficient anti-interference ability. This is also the biggest advantage of wireless communication technology to control intelligent mobile robots.

At present, China's economic development trend is improving rapidly, and various domestic undertakings have made achievements. Among them, network video surveillance has been widely used in national defense, transportation, and

many other fields because of its convenient operation and economic characteristics. It also has good penetration and application in people's daily life. In order to meet diversified use needs and realize wireless transmission, it is very important to actively carry out the research on intelligent robots. Zhou et al. made a research statement around the intelligent substation. In order to ensure the normal operation of the intelligent substation, they mainly analyzed the R&D and application of its internal robots [1]. Zhang and Hu have adopted the idea of combining intelligent robots with wireless remote control technology to build a wireless network platform between computers and robots with the increasing development of information technology. It can not only realize wireless data transmission on the platform but also monitor the working conditions of the robot on the computer terminal, so as to truly realize man-machine coordination [2]. Tang and Wei analyzed in detail the advantages of mobile video monitoring in 4G technology over traditional video monitoring in their research in combination with the actual situation of the video monitoring in high-speed operation [3]. In Zhang et al.'s study, in order to effectively promote the normal operation of unattended information machine room, ensure the operation reliability of equipment in the machine room, and improve the level of automation and informatization, so as to realize the inspection of equipment in the machine room through robots, the design of intelligent robot system in the information machine room is analyzed [4]. According to Yuan, people cannot live or work without the power industry. The operation and maintenance service ensures the reliability of software and hardware equipment and improves the stability of information system operation, thus ensuring the power demand of tens of millions of households in the power grid [5]. Cai and others will integrate the Internet with a variety of cutting-edge technical measures such as sensing technology, vision technology, and wireless transmission and carry out the work in the computer room in a completely autonomous or remote control way, so as to improve the efficiency of the inspection work in the computer room, control the labor cost more effectively, and avoid the risk of manual operation to the greatest extent [6]. According to Wang, computer technology is constantly improving, and the size, quality, and volume of the computer room are gradually updated, from miniaturization and visualization to large-scale applications, complexity, and three-dimensional applications. Among them, cloud computing technology has been deeply studying applications [7]. Yang et al. proposed a research and analysis on intelligent monitoring system of information machine room, including video monitoring system, intelligent cabinet door lock system, remote call system, personnel positioning management system, and geographic information system. The technologies involved include face classification technology and RFID (radio frequency identification) technology, which can better solve the problems of current computer room monitoring management system [8]. It can be seen that with the development of technology, video surveillance has gradually penetrated into the mobile era. Security issues have also gradually attracted people's attention. As an important part of the security system, video surveillance has been widely used in all walks of life. At the same time, with the continuous popularity of

smart phones and tablet computers, the public increasingly prefer to monitor video on mobile terminals. Therefore, mobile video surveillance system has been paid more attention.

## 2. Wireless Communication Standard

With the rapid development of wireless technology, people's lives are gradually networked and informationized, so various wireless network technical standards have been formulated. In order to realize automatic control, liberate human beings from the wired environment, and replace cables as the goal for wireless personal area networks, short-range wireless communication technology standards have been developed. The traditional network scale cannot meet all the needs. Wireless communication can be carried out through Bluetooth, radio, etc. That is why we have highways and sidewalks. A typical wireless system consists of a wireless transmitter (including data source, modulator, RF source, RF power amplifier, and wireless and power supply) and a wireless receiver (including data receiving circuit, RF regulator, decoder, RF low noise amplifier, and wireless and power supply). Wireless communication refers to the long-distance transmission communication between multiple nodes without transmission through conductors or cables. In addition to the traditional manual operation and automatic detection with wireless transmitters, the tracking of equipment and personnel, remote control of unmanned operation points, remote team cooperation, and mobile video monitoring can also be realized through the use of wireless access mobile devices.

## 3. Development Status of Mobile Video in Information Room

With the continuous development of the security industry, the advantages of mobile video monitoring have gradually emerged. Traditional security enterprises have either transformed or been eliminated by the market. The combination of mobile Internet has broadened the impact of the Internet. Mobile video monitoring is a part of the Internet. New technologies such as mobile Internet cloud storage, cloud services, and big data have brought new directions to the security industry, social progress, and economic improvement. More and more industries will use different types of mobile video monitoring systems based on their own different needs. Mobile video monitoring systems are not only used in all aspects of enterprises but also loved by thousands of families. Compared with network video, mobile video is a relatively young industry. In recent years, due to the development of smart phones and networks, it has provided nutrients for mobile video screens. At present, mobile video is on the rise. In the process of developing mobile video surveillance system in an all-round way, there are also various problems. Among them, the security of video data makes people suspect. Nowadays, monitoring video technology is widely used. Many criminals use monitoring technology to endanger the stability of enterprises and families, which may seriously affect the development of society and the country. Mobile video monitoring technology is not perfect

at present. Enterprises may use advanced network monitoring video systems, and families use more mobile video monitoring. With the rapid development of 5G intelligent network, it has added nutrients to mobile video. Real time monitoring can be achieved by opening the network anytime and anywhere. On the whole, mobile video is in the rising stage of industry development. The future monitoring video industry needs to further promote its development to make the mobile monitoring video screen more secure and functional.

Figure 1 shows the proportion of mobile video monitoring system in the industry. It can be seen from the figure that many mobile video screens are selected at present. All these have laid an important foundation for the mobile video surveillance system, making it possible to realize the video surveillance system based on the mobile terminal platform, because they not only have the video monitoring function of traditional mode but also have the most important function of remote network video monitoring. The advantages of mobile images are that the image information is transmitted through the collection equipment, and the distance is unlimited. It is simple to operate, can be viewed at any time, and saves manpower and material resources. The function of monitoring remote real-time dynamic pictures can be realized through mobile phones or computers, which provides convenience for enterprises and families.

**3.1. Traditional Video Monitoring System.** Since the video surveillance technology was introduced into China in the 1980s, it has been developing rapidly with the rapid growth of security demand. The traditional video surveillance system is a traditional CCTV system represented by VCR. The system is mainly composed of analog cameras, special cables, video switching matrix, analog monitors, analog video equipment, and video cassettes. In the mid-1990s, a video monitoring system based on PC card appeared. Although it has initially realized digitization, there are certain loopholes and defects in the traditional video control mode. For example, it cannot achieve lasting work due to the influence of distance and signal. Traditional video surveillance is a kind of passive surveillance. The current monitoring system can only play a video role in most cases. In the event of an abnormal situation or emergency, it is necessary to find the video to find out the video at the time of the event, but at this time, the loss accident has been caused and cannot be recovered. It is completely a kind of passive monitoring. Especially when limited by communication equipment, traditional video surveillance cannot achieve full coverage of long-distance areas. The analysis of traditional video monitoring system is shown in Figure 2.

Figure 2 shows the system logic architecture of unified video monitoring. Through the data communication information transmitted from the outside, the video signals output by various image sensors, cameras, video recorders, televisions, and other equipment are sampled, quantified, and controlled. The video sensor system collects the corresponding video data, further analyzes the video information data through system positioning observation, and finally locks the target through target classification and tracking, so as to see the event information more intuitively. However, due to

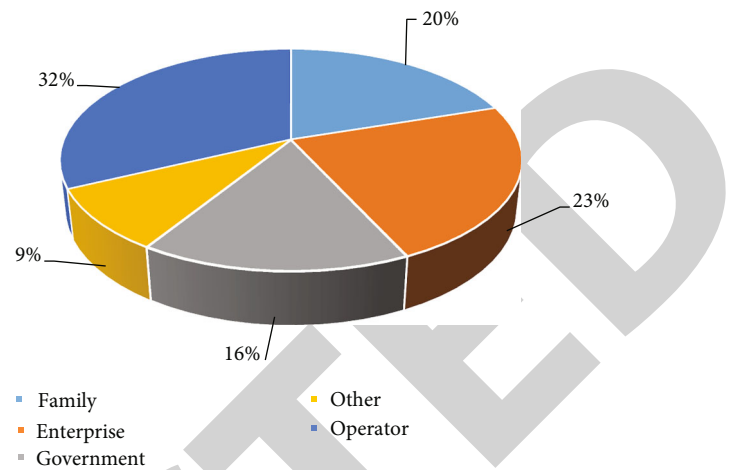


FIGURE 1: Proportion of mobile video monitoring system industry.

the limitations of traditional video surveillance, the coverage is not comprehensive, and the collected data is incomplete, which greatly reduces the authenticity of the event.

**3.2. Mobile Video Monitoring System of Information Machine Room Based on Intelligent Robot Technology.** According to the development of modern robot technology, the demand for mobile video surveillance of robots is becoming more and more extensive. In many dangerous areas, robots must have wireless video surveillance function. The place where the information machine room equipment provides the operating environment can be a building or part of a building, including the main machine room, auxiliary area, support area, and administrative area. Mobile video surveillance has the advantages of strong flexibility, fast deployment, and easy application. It has the irreplaceable characteristics of traditional surveillance. The video monitoring system effectively improves the efficiency, reduces the amount of useless data, and improves the response speed. It has controllability, alarm accuracy, emergency response speed, protection level of security department, and active system monitoring. It is an effective progress in technology development. Therefore, it has been widely used in information rooms in various industries. The analysis of mobile video monitoring system in the information room based on intelligent robot technology is shown in Figure 3.

As can be seen from Figure 3, the front terminal system of intelligent mobile video is generally composed of a camera, driver, and RFID module to realize audio and video collection, compression, wireless transmission, local storage, alarm information uploading, and GPS positioning data uploading. A video server can be divided into a video encoder and video decoder from the core function. The video encoder is located at the front end of the network video monitoring system, while the video decoder is located at the user access end (or back end). 5G module mainly carries the video stream of monitoring video and various control messages, including public data communication network and private data communication network. Realize the accelerated transmission of video data storage service, and

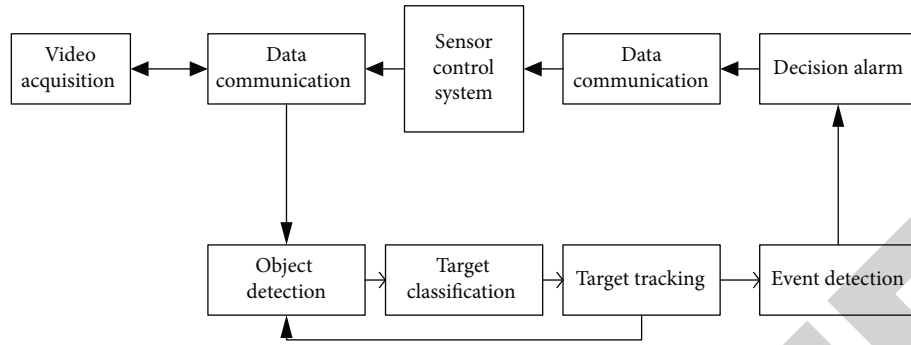


FIGURE 2: Logical architecture of the traditional video monitoring system.

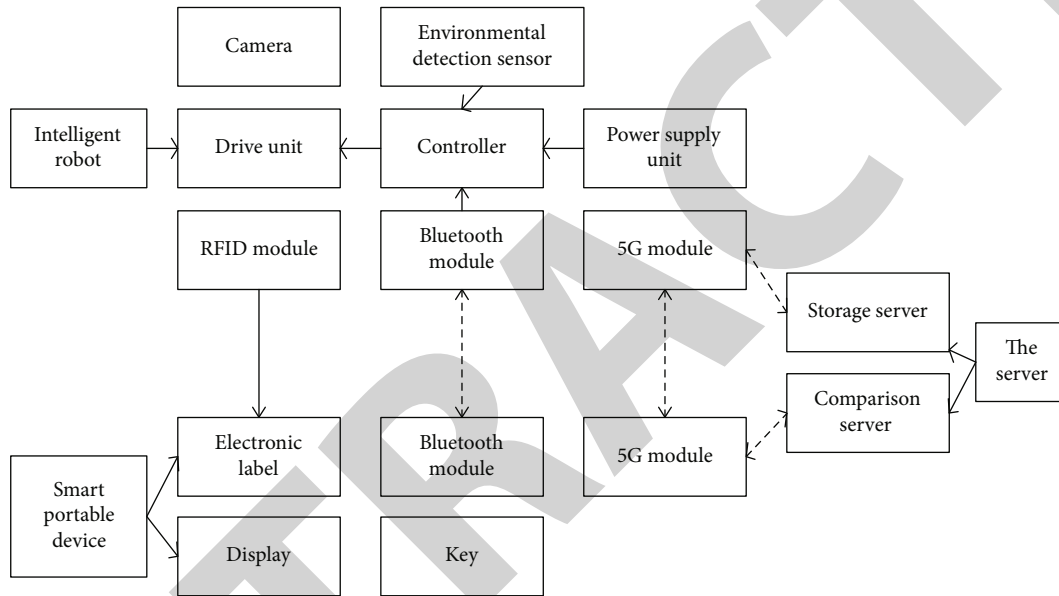


FIGURE 3: Logical architecture of mobile video monitoring system in the information room based on intelligent robot technology.

avoid the repeated transmission of data and ensure the integrity of data. Therefore, for large-capacity real-time transmission or application services that require high real time, integrity, and confidentiality of data transmission, in order to save channel costs, improve transmission rate and transceiver conversion rate, and enhance its stability and reliability, a special data server is built. After being processed by the video encoder, the information is uploaded to the central management platform through the IP network and then distributed by the central management platform to the client, video decoder, and video storage device.

#### 4. Mobile Video Monitoring Information Collection

In mobile video surveillance system, obtaining good video image is the basic requirement of video compression and transmission. Hardware acquisition can be developed conveniently and quickly, but the hardware cost is high and it is not convenient to change and optimize. With the continuous improvement of computer processing capacity, software

can be used to realize video acquisition. Mobile video monitoring system uses wireless communication technology, based on human model features, adaptive variable frame rate coding, and content security authentication. After the video data collected in real time by the monitoring point is compressed and encoded, it is transmitted to the monitoring center in the form of streaming transmission. In the infinite channel environment with low rate and high bit error, the video quality of the video monitoring image and the security of video communication are guaranteed as much as possible. The control center of the monitoring system is the core of the operation of the whole system. Collect the detection information uploaded by the monitoring station, send various operation commands, and control the industry of the monitoring station. The monitoring station is distributed at each monitoring point far away from the control center and is responsible for collecting the information and responding to the control commands issued by the control center. The biggest problem to be solved at the video acquisition end is to compress and encode the collected video information. The video compression process basically

eliminates the invalid information in the video signal and reduces the information content in the image. This can be achieved by analyzing the statistical predictability of video signals. Mobile images are collected and encoded by acquisition equipment. After multichannel equipment processing, ultrashort wave equipment and mobile satellite equipment are used for air transmission of mobile signals. The mobile video monitoring network for mobile transmission and mobile reception is composed of CMMB system for mobile phones, PDAs, MP3, MP4, digital cameras, and notebook computers by using urban network coverage technology. The measured bandwidth in the downlink of the data network can be stabilized at 60 kbps to 80 kbps, and the images obtained through data transmission can realize mobile video information monitoring.

*4.1. Design of Video Monitoring System.* The monitoring system is an important part in the field of security. The system directly observes the situation of the monitored place through cameras and auxiliary equipment and simultaneously records the situation of the monitored place. Video monitoring is mainly used in many fields, such as transportation, commerce, and finance, and is one of the important means of modern management and monitoring control. According to Yang et al., mobile video monitoring system based on WiFi connection can realize large-scale wireless monitoring and patrol, obtain video monitoring pictures in real time, and control the movement of cameras and monitoring devices in real time. It has the advantages of high integration, good confidentiality, strong practicability, and good expansibility [8]. According to Zhang et al., with the development of network technology, mobile video monitoring system has become an indispensable means in urban management. The rapid development of 5G technology provides a broader development space for the application of mobile video monitoring system in urban management [9]. In Qu et al.'s study, Mobile video surveillance technology mainly collects data information through positioning detection, motion tracking, and data processing of moving targets, so as to realize intelligent collection of surveillance video in the security field, facilitate analysis and management, and improve work efficiency [10]. Bu and Wang proposed that network video monitoring has been widely used in various fields. The application of network monitoring system can better serve the public, maintain social stability, and promote the sustainable development of China's social economy [11]. With the continuous improvement of monitoring accuracy, there is a higher demand for a real-time and stable system. However, the available wireless transmission bandwidth is limited, and the definition and real-time performance of mobile video cannot be met at the same time. Therefore, the research and design of an efficient, stable, and interactive long-range mobile monitoring system have a wide range of practical application value.

*4.2. Comprehensive Performance Analysis of Mobile Video Monitoring System in Information Room under Different Technologies.* With the development of computer technology, the video monitoring system has been constantly

TABLE 1: Comprehensive performance analysis of mobile video monitoring system in information room under different technologies.

Grouping	Traditional technology	Intelligent robot technology
Convenience	78.55	89.64
Efficiency	59.64	92.13
Practicability	60.56	85.34
Functionality	65.79	88.15

updated, from not being able to see to being able to see. Especially in the management of the computer room, various technologies emerge endlessly. The video screen of the computer room is one of the highlights. It not only has the function of traditional analog video screen monitoring but also has network monitoring, and the transmission distance is unbounded,

Mobile video has been widely used in various areas. In this development process, although video monitoring system and equipment have made achievements in function and performance, the mobile video monitoring system is comprehensively analyzed according to different technologies from the aspects of convenience, efficiency, practicality, functionality, and so on. Table 1 is obtained.

Table 1 shows the comprehensive performance data of the mobile video monitoring system under different technologies. In each performance, it can be seen that the intelligent robot technology is significantly better than the traditional technology, ensuring the accuracy and work efficiency of data preparation.

In order to better evaluate and compare the mobile video monitoring systems in the information room under different technologies, the data in Table 1 are visualized and Figure 4 is drawn.

Figure 4 shows the visualization of the comprehensive performance evaluation of the mobile video monitoring system in the information room under different technologies. It is very intuitive to see that the intelligent robot technology can be better applied to the mobile monitoring system in the information room, so as to facilitate and intelligently drive the mobile monitoring system, which fully illustrates the convenience and efficiency of the intelligent robot. The practicability has greatly improved the function and capability of the mobile video monitoring system in the information room.

*4.3. Analysis on Video Coupling Degree of Mobile Video Monitoring in Information Room under Different Technologies.* For the computer room information mobile video monitoring system under the intelligent robot technology, in order to get better results of the information room mobile video monitoring, the research is divided into two groups of objects to verify the relevant effectiveness of the system. First, the coupling degree of different algorithms for the information room mobile video monitoring under the intelligent robot technology is compared, as shown in Table 2.

Table 2 shows the comparison of the coupling degree data of the traditional video surveillance and the mobile

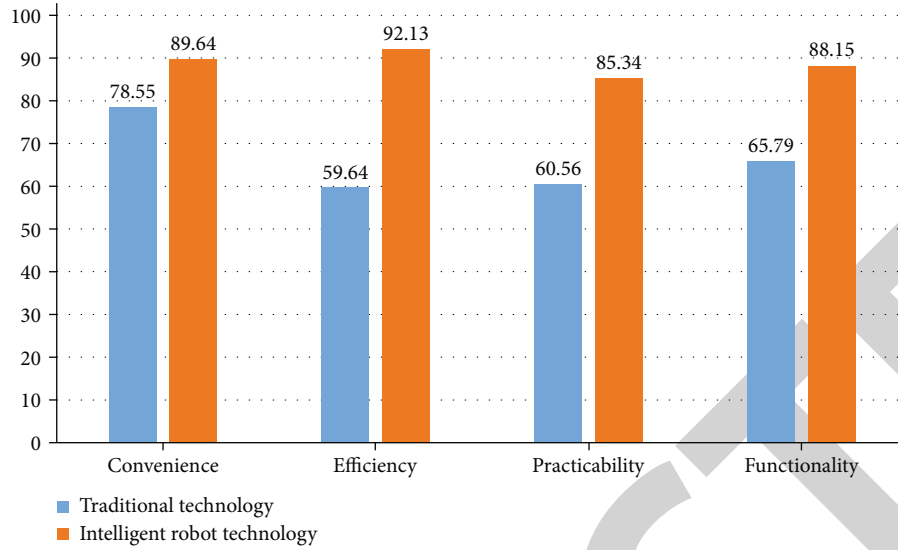


FIGURE 4: Visual diagram of comprehensive performance of mobile video monitoring system in the information room under different technologies.

TABLE 2: Analysis of video coupling degree of mobile video surveillance in information room under different technologies.

Group	$n$	Before coupling	After coupling
Traditional video surveillance	17	$35.1 \pm 3.7$	$58.6 \pm 2.3$
Intelligent robot mobile monitoring video	17	$38.3 \pm 4.1$	$53.7 \pm 1.9$
$T$		8.432	7.714
$P$		0.007	0.008

video surveillance of the intelligent robot technology used in the information room. The coupling degree data of the mobile video surveillance using the intelligent robot technology is significantly higher than that of the traditional video surveillance, and the difference between the two groups is obvious,  $T < 10.000$ ,  $P < 0.05$ , which has obvious statistical significance.

## 5. Control Mode of Intelligent Robot Mobile Video Monitoring

As the application scope of robot continues to expand, the working environment it faces is becoming more and more complex, which is often unknown, dynamic, and unstructured. Therefore, to complete various tasks in real time in this environment, it poses a new challenge to the control of robot. According to Tian, mobile robot is based on WiFi wireless video monitoring. The robot uses the main control chip to complete the data processing and data exchange tasks between the main control chip and the WiFi module. The direction control of the trolley is completed through the driving circuit and motor. The direction control of the camera is completed through the steering gear to realize video monitoring in different directions. The environment detection and other functions are completed through the

sensor part [12]. The intelligent robot mobile video surveillance in this study adopts intelligent control. Intelligent control can achieve the goal of controlling the mobile video surveillance system by using various intelligent technologies. It is a new type of automatic control mode with strong vitality. The emergence and development of intelligent control reflect the development trend of modern automatic control and even the whole science and technology and the rapid development and major progress of modern science and technology. At the same time, the intelligent controller has the characteristics of online feature recognition, feature memory, and personification. In the whole control process, mobile video monitoring information can be obtained online. By constantly optimizing parameters and finding the best structure of the controller, the best overall control performance can be obtained.

## 6. Conclusion

With the continuous development and application innovation of 5G technology and intelligent video monitoring in intelligent services, the mobile video monitoring of robot technology is widely used in information machine rooms. It is widely used for working condition monitoring, finished product inspection, and quality control to help improve

production flexibility, production efficiency, and production automation. However, most of the existing video surveillance cameras are fixed mounted, which cannot carry out height rise and fall according to the internal actual terrain. Therefore, it has certain limitations in use and cannot well cope with the change of terrain. The defects and solutions of intelligent control; the progress of mobile robot analysis and research, including system architecture, environment modeling and positioning, path planning and obstacle avoidance, and fault diagnosis; and the development prospect of intelligent control are analyzed [13]. Li and Zhang designed a remotely controllable mobile video monitoring system in order to expand the flexibility of the video monitoring range of the camera. The smart car of the system is equipped with a camera to receive user instructions for mobile video acquisition [14]. The system realizes the real-time collection of video data through the interface, sends the data to the server through the network, and forwards the control instructions from the user to the smart car. The server is used to forward video to the client and user control instructions to the system, which can effectively solve practical problems.

Compared with traditional video surveillance system, intelligent mobile video surveillance system not only saves human and material resources but also is more convenient to operate and more scalable. At present, the main problems and functional requirements of the video monitoring system are that the intelligent video monitoring system should have low energy consumption, low power consumption, convenient operation, intelligence, and practicality, which provide the computer room with. This research first deeply analyzes the current development status and existing problems of video surveillance technology in the information room and then puts forward the architecture of mobile video surveillance system in the information room based on intelligent robot technology. The system architecture integrates computer technology, control technology, and network technology and centrally monitors the operation status of equipment in the computer room and the environmental status of the computer room. Intelligent inspection robots are mainly used in equipment rooms, information rooms, power distribution rooms, main control rooms, high-voltage switching rooms, etc. in various fields. The robot receives the work instructions from the system and performs the corresponding work tasks to realize the all-round inspection coverage of all indoor equipment, which is conducive to improving the management efficiency of the computer room and provides a new idea for ensuring the safe and stable operation of various equipment and systems in the computer room.

### Data Availability

The data underlying the results presented in the study are available within the manuscript.

### Conflicts of Interest

There is no potential conflict of interest in this paper.

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