Websites:
http://www.sciencepub.net
http://www.sciencepub.net/researcher

Emails:
editor@sciencepub.net
marslandresearcher@gmail.com

Researcher

MARSLAND PRESS
Multidisciplinary Academic Journal Publisher

Discuss the examples of panoramic technology in the video industry — Technical challenges in the video surveillance industry

Enze Zhang

Chengdu Eapil Technology Co., Ltd.

Abstract: Video industry is divided into two categories: video entertainment industry and video monitoring industry. The video surveillance industry pays more attention to the data value, transmission sensitivity, applicability and security attributes of the content. Along with the progress of The Times, constantly change video technology, the boundary integration gradually, there is no denying the fact and predictably, the video is great entertainment and video monitor will incorporate AI video, but is limited by the current technical development speed, in the next few years, still can be classified in accordance with the standards for the analysis of the video industry. In this paper, in view of the video surveillance industry, the existing professional security monitoring, intelligent household, analysis, vehicle traveling data recorder, AI, meeting records, and other special industry such as UAV (unmanned aerial vehicle) /robot segmentation use cases, based on this, this article unified the records, data application attribute strong video industry is divided into video surveillance industry. The reason why this paper makes a strict distinction between video surveillance industry and video entertainment industry is that the two industries have obvious differences in requirements of panoramic technology. Video entertainment industry is more about professional consumers driving enthusiast consumers to drive interest consumers and finally popularize to mass consumers, and the generated content also extends from professional film and television content to daily fragmented entertainment and sharing. Compared with the video surveillance industry, it has a strong B-terminal property, emphasizing more on functionality, practicality and systematization.

[Enze Zhang. **Discuss the examples of panoramic technology in the video industry — Technical challenges in the video surveillance industry.** *Researcher* 2021;13(3):6-10]. ISSN 1553-9865 (print); ISSN 2163-8950 (online). http://www.sciencepub.net/researcher. 2. doi:10.7537/marsrsj130321.02.

Keywords: panoramic technology, video monitoring, segmentation, monitoring industry

1. Introduction

Panoramic technology is a real need in the monitoring industry. The monitoring application field naturally has the demand of "no dead corner", and panoramic technology is a relatively better choice. In the traditional monitoring industry, in order to solve the dead-end problem of monitoring, the requirements of equipment installation specifications, the number of monitoring equipment, selection, cost and other conditions are often harsh. In recent years, both mechanical head monitoring equipment and single fish-eye wide Angle monitoring equipment have taken on important missions in the monitoring industry, but they still cannot solve the dead-angle problem perfectly in many scenes. The panoramic technology can not only realize the real-time image capture without dead Angle, at the same time, the long-term storage of historical images can also carry out the dead Angle image retrieval; The panoramic screen of the all-day ball has no special requirements on the Angle and orientation of equipment installation, which is more flexible, convenient and anti-jamming. Optical electronic picture capture contrast mechanical head can bring a smooth perspective selection experience and long life and stability. Therefore, it can be expected that, with the maturity and popularization of panorama technology, panorama products will become the general products in the video surveillance industry.

2. Examples of video surveillance industry segmentation and technical challenges of video surveillance industry

For the video surveillance industry, there are the following subdivided use cases: Professional security surveillance, smart home, automobile data recorder, AI analysis, meeting minutes, UAV/robotics, other special surveillance industries.

In the above use cases of industry segmentation, the two use cases of smart home and dashcam are more end consumers, and they are also consumer products with low average price and consumers generally care about the cost performance. In addition, they are more for government, enterprise and industry-specific products. As a result, video surveillance products often have the following basic

attributes:

High stability: including strict requirements of high and low temperature, humidity, salt spray environment, heat dissipation, power consumption, and long time trouble-free operation;

High compatibility: it includes security, confidentiality, specification and other standards of each independent industry/country and integration standards of each equipment management system company;

Cost-effective: whether enterprise purchase, government bidding, or personal application requirements, price often is the important measure of functional and practical.

At the same time another video monitoring products natural attribute is: because the product is most associated with the user's some work continue to work, a lot of monitoring is a perennial "without such equipment, is the default" high frequency "use the product, so monitoring products tend to produce vast amounts of data, the application of data, screening is also higher challenge.

Because of the video surveillance product functionality and practicality of the systematic demand is higher, so this article argues that in the video surveillance industry without too much emphasis on panoramic technology itself on the experience, display, share, particularity, more focus on pragmatic pursuit: video data integrity, information extraction and convenience, the development of industry application. In this way, panoramic technology products can be promoted to become the industry's general products more quickly.

In the video surveillance industry, after research, there are the following key technological breakthroughs:

- Monitor panoramic baseline clarity
- Equipment stability criteria
- Hardware/software/standards compatibility
- Cost performance standards
- Optical/structural design optimization
- Data transmission confidentiality standards
- Overlay function matching
- AI screening and application
- Panoramic modeling techniques

Below is a detailed description of each key breakthrough technology and related requirements.

3. Monitor the definition and resolution of the panoramic reference

Monitoring is a typical industry with reasonable requirements for image clarity and quality. Since the beginning of the 21st century, the mainstream graphics technology in the monitoring industry has been from analog to digital to HD to ultra clear, spanning 300 lines, 480 lines, 720P and 1080P. At the same time, the sharpness of the images captured by the cameras is increasing. In principle, although the definition of the monitoring equipment is naturally the higher the better, but limited to the system storage, network transmission, core computing power, cost climbing, cost performance, etc., the definition of the monitoring system from the general trend is only steadily improving. At present, China's monitoring technology has become the world's leading, skynet, smart city, more than one standard, and other concepts have been deeply rooted in people's minds, and the ultimate goal of systematic construction is the interconnection of everything and information integration.

The following is a breakdown of the requirements for clarity for different monitoring applications.

- Standard resolution and optimized resolution of professional security monitoring panorama

In 2017 alone, the market share of the security industry was 500 billion yuan, of which the surveillance image equipment and its surrounding areas accounted for 30%. In recent years, with the continuous strengthening of the stability of the country and even all regions of the world, the annual security investment is also increasing. Due to its strong system level characteristics and multiple product categories, the effective clarity range of the current security system is 3-15 meters for indoor security monitoring, 5-100 meters for outdoor security monitoring, and 100-3000 meters for remote security monitoring system.

- Standard resolution and optimized resolution of smart home panorama

The purpose of smart home monitoring is more to watch homes, children and pets, and the demand for event capture is much higher than the requirement for detailed analysis and identification of targets. Meanwhile, in the smart home scene, consumers pay much attention to the simple way of use and the ease of camera placement.

When considering the resolution of the smart home security camera, also need to consider the public consumers home network uplink bandwidth capacity, according to the 2016 China broadband speed status reports, China's average fixed broadband download rate reached 9.46 Mbit/s (i.e., user awareness rate), the equivalent of more than 1M upload bandwidth, this shall prevail, to support general H. 264 under the code of 1080P and H. 265 coding image transfer 3K.

- Standard resolution and optimized resolution of on-board camera panorama

Vehicle-mounted cameras include front-mounted and rear-mounted cameras. The global monthly shipment of vehicle-mounted cameras has exceeded

10KK (10 million). With the increasing demand for electric vehicles and autonomous driving, this data will also increase continuously. According to statistics, the ratio of front-mounted camera to rear-mounted camera is 7:3.

At present, on-board cameras have three monitoring functions: the continuous growth of safety protection schemes, the need to increase visibility of road and in-car environment to enhance safety, and the popularity of commercial vehicles. At the same time, intelligent expansion of vehicle also has three requirements: intelligent moving object detection system, integrated driving assistance system and driving behavior detection system. In addition, there is a great demand for capturing images inside and outside the vehicle without dead angles. It can be said that omni-directional panoramic video capture inside and outside the vehicle can improve the comprehensiveness and reliability of on-board system and vehicle information, which is in line with the development direction of on-board technology.

The fundamental demand of video surveillance industry for video is the transformation of information value, and at present a huge contradiction is the contradiction between the constantly developing demand for video data information value mining and the explosion of massive video data. In order to obtain more complete and comprehensive information, more equipment laying is promoted, and the work of subsequent information screening is also greatly increased.

4. Stability criteria

The stability standard of panoramic technology is inherited from the requirements of common monitoring system, which means that complete high and low temperature test, salt spray test, vibration test and other experiments are required before the equipment can be used. In terms of test standards, panoramic surveillance products need to completely inherit the standards of common surveillance equipment. As there are many inspection standards for security video surveillance cameras, several typical stability test standards are highlighted below.[1]

- Shell protection capability

For equipment used indoors, its level A protection capability shall meet the provisions of IP20 in GB4208-2008, and level B protection capability shall comply with IP32 requirements; For equipment used outdoors, its level A protection capability hall meet the requirements of IP65, and level B protection capability shall meet the requirements in IP66. In some special application environments, IP67/IP68 levels of protection may be required for scenario requirements.

- Environmental adaptability

The camera satisfies at least one of the following environmental categories

Class I: including, but not limited to, indoor living or office environments;

Class II: including but not limited to indoor public areas;

Class III: including, but not limited to, outdoor areas with direct rain and sun protection, or indoor areas under extreme environmental conditions;

Class IV: Outdoor in the general sense.

- Electromagnetic compatibility

The limits shall be in accordance with the provisions of Test Grade 3 in GB/T 17626.2-2006, including electrostatic discharge immunity, radiofrequency electromagnetic radiation immunity, electrical fast transient pulse immunity, surge (impact) immunity, radiofrequency field induction conduction disturbance immunity, radiation immunity, etc.

5. Standardization and compatibility

As the products of the monitoring industry are not independent, a whole set of monitoring system is usually formed by the linkage work of several different kinds of products. This means that the panoramic technology of different segmentation applications must be compatible with related standardization requirements and platform requirements. The following is a brief introduction to a few typical standards, platforms and certification systems.

6. Panorama cost performance standard

Normally, price/performance ratio is an unpredictable indicator, because the consumer's pursuit of low price is endless, and the product end of the service end of the technology end of the supply side to maintain a good profit is natural. However, for the potential "universal video technology", panorama technology cannot obtain effective basic market feedback if it does not reach a standard value.

The cost performance itself is also the result feedback of a series of comprehensive indicators related to a technology, such as technology maturity, product manufacturing maturity, supply chain component maturity, user cognitive maturity, etc. At the same time, the selection of new products and new functions of the monitoring industry itself is also directly related to the cost performance of a product. Therefore, this paper chooses the cost performance standard to keep the important index of video surveillance industry panorama technology development.

[1] [GAT 1127-2013 General Technical Requirements for Security Video Surveillance Cameras, Ministry of Public Security, PRC, January 1, 2014, ICS13.310/A91]

7. Optimization of optical/structural design

As the application scene of monitoring equipment has more stringent requirements on temperature, environment, protection, etc., the optical/structure of the monitoring industry needs to further consider high and low temperature (-40℃ ~85℃), waterproof and dustproof, and head glass anti-scratch and anti-knock.

8. Confidentiality protection of panoramic data transmission

With the information transmission and sharing becoming more and more convenient, public consumers are increasingly concerned about their privacy protection. In particular, remote monitoring equipment, once the data security technology is not passed, there will be a large-scale privacy leakage problem, which will cause a huge social impact. According to the survey, especially in the use of smart home camera equipment, people's demand for data encryption and privacy ranked second, which has become one of the most concerned device functions for consumers. In addition to smart home, professional security, vehicle-mounted and other industries also have very high requirements for the confidentiality of data transmission. Once the data security is solved, the equipment popularity will be greatly enhanced and the application scope of monitoring system will be further expanded.

Panoramic equipment has a larger field of vision and can realize no-dead Angle monitoring, which, on the one hand, improves the convenience and reliability of customer monitoring. However, once privacy leakage and data security problems occur, it will cause greater loss and harm than ordinary cameras. Therefore, the panoramic monitoring equipment needs to have perfect data security technology to protect itself.

9. Panoramic overlay function matching

Monitoring devices tend to not only focus on image capture itself, but will require panoramic monitoring to have the common functions of many common cameras or to realize mutual matching functions due to different environments and application scenarios. But due to the particularity of the panoramic itself, many functions cannot direct translation based on the original technology, need for panoramic customized ascension and meet the demand, which contains such as panoramic view panoramic night vision fill light, low power consumption, panoramic panoramic view with ordinary equipment linkage, hard disk video recording system, panoramic audio matrix, etc., choose three typical function matches below brief introduction:

Panoramic night vision and supplementary light, monitoring devices have functions all year round, which require capturing effective pictures no matter in day or night. Currently, there are two mainstream night vision solutions for ordinary cameras: highly sensitive starlight technology and infrared light supplementation technology.

10. Panoramic AI screening and application

The AI technology mentioned in this paper especially refers to the application of image recognition based on AI. As one of the important fields in AI industry, image recognition technology has been more and more widely applied under the background of the rapid development of computer technology and information technology. Always produce huge amounts of video surveillance industry, at the same time monitoring managers need to seek to a small number of extremely valuable in the huge amounts of data information, with the improving of the surveillance video resolution, the human ability to recognize already cannot satisfy the daily monitor screen, so the current people rely on computers to analyze video.

11. Panoramic modeling technique

Some consumers who are not familiar with panorama are prone to mistakenly interpret ordinary panorama picture as "3D" picture. In fact, ordinary panorama picture does not contain 3D depth of field information. This illusion is caused more by the fact that panorama can be adjusted and selected at will from the perspective and can be viewed without dead Angle, which is different from ordinary picture. Therefore, in a sense, the panorama can be called a "2.5D" picture.

12. Conclusion

The above key technologies to be breakthrough focus more on high stability, high compatibility, high cost performance and the maturity of more new functions and applications. In the view of this paper, these are the technical preconditions for the panoramic video surveillance industry. Panorama technology will become a "general video technology" in the video surveillance industry, but this paper believes that the improvement of this industry is not subversive, but more about the upgrading of functions and applications. By obtaining more information, panorama technology creates more data value and application value for the monitoring industry. Meanwhile, the extraordinary cost performance will greatly affect the popularity and maturity speed of panorama, a new technology. Since the monitoring industry has more B-terminal properties, the recommended way of product development in this

paper is to start from low cost performance ratio and gradually upgrade to high cost performance ratio and customized products in the industry.

(Hereby declare：Part of the original text has been abridged and edited.)

References

1. Grau, Oliver; Custance, Gloria (2003). Virtual art: from illusion to immersion ([Rev. and expanded ed.] ed.). MIT Press. ISBN 978-0-262-07241-0.
2. Oettermann, Stephan; Bell, Rob; Flannel (Firm); Zondervan Corporation (1997). The panorama: history of a mass medium Zone Books. ISBN 978-0-942299-83-0.
3. Comment, Bernard. XIXe siècle des panoramas (1999). The panorama (Rev. and expanded ed. Reaktion. ISBN 978-1-86189-042-9.
4. Hannavy, John (2008). Encyclopedia of nineteenth-century photography. Taylor & Francis Group. ISBN 978-0-203-94178-2.
5. https://www.technologyreview.com/video/604500/the-360-degree-selfie-10-breakthrough-technologies-2017/ original foreign website, https://36kr.com/p/5064615.html domestic report

3/2/2021