Network Image Monitoring System Based on Image Processing and Pattern Recognition

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Abstract: With the continuous development and progress of science and technology, image surveillance technology has received widespread attention. With the help of communication media, hardware systems, software systems and other systems, the system can play an effective role. At the same time, the image network surveillance platform constructed by integrating computer technology and image processing technology can improve the safety of people's daily production and life. This paper analyzes the concept of image processing and pattern recognition, and explains the application of image processing and pattern recognition network image monitoring system. Finally, the practice control system of network image monitoring system is discussed with reference to the experiment.

1. Overview of Image Processing and Pattern Recognition

Both image processing and pattern recognition are the technical patterns applied in remote monitoring projects, and they have a certain progressive relationship. After image processing operation, the corresponding pattern recognition can be completed, so as to integrate the complete processing framework. That is to say, after the image data is acquired by the image device, the corresponding image processing is performed, and the internal feature information of the image is extracted, thereby completing the image recognition, and then the recognition result is output by using the mode analysis method.

1.1 Image Processing

In recent years, image processing technology has been widely used. In image processing, image acquisition is the first. It mainly uses basic equipment such as cameras or cameras to collect and summarize images, so that the corresponding image data can be transformed into analog signals by using the acquisition card, and the corresponding digital signals can be generated quantitatively to ensure the rationality and integrity of transmission.The most important thing is that after the information data is converted into a signal factor, because the data is large, the centralized compression processing is to use the device hardware to complete the corresponding operation.

In addition, after the end of data acquisition, the corresponding image processing work should be carried out to ensure that the image can be processed and controlled systematically in accordance with image color enhancement, image thinning and segmentation, image edge extraction and other ways, effectively complete the pre-processing items before the processing work, and implement the corresponding capture and deletion control combined with the items that may cause interference in the image. Ensure that the original image can be simplified in a preliminary nature, laying a solid foundation for the extraction of important features. It is worth mentioning that in the process of preprocessing, it is necessary to apply processing tools that are more suiTable for practical needs, such as gradation transformation and sharpness adjustment, thereby improving the level of image processing.

After the image processing is finished, the image of the image is analyzed and concentrated, and the special points in the image are effectively displayed to ensure that the image data can be more suiTable for other work after the analysis, and the subsequent image feature extraction and

Application management provides protection. In addition, we need to analyze the data features with the help of image feature extraction work flow, and effectively form a unified data model. On the basis of matching feature contrast processing, we can identify the effective information and remove redundant information [1].

1.2 Pattern Recognition

The so-called pattern recognition is the comprehensive analysis and identification of fixed patterns, the effective establishment of a complete information supervision and control mode, the fundamental implementation of the corresponding information supervision and management points, and the improvement of voice analysis, face analysis, fingerprint analysis, character analysis and fault analysis, fundamentally improve the effect of image analysis and image processing. Generally speaking, in the pattern recognition mode, the image information is digitally transformed, and then the corresponding feature extraction is completed. At this time, the image sample and the feature selection result can be combined to perform classification processing, and finally the corresponding result is obtained. At present, the more common pattern recognition mechanisms are mainly divided into the following four types:

1) Statistical recognition mainly uses the histogram to complete the display and processing of information in the image. It is necessary to use the mean, variance and specific difference for computer calculation, and the obtained result can objectively describe the basic features of the image;

2) Template matching, in the actual application process, it is necessary to calculate and analyze the minimum variance matching between sample image and standard template image. According to the corresponding template, the basic attributes and categories of sample image can be determined by the minimum variance.

3) Fuzzy recognition is mainly aimed at some blurred image data. In order to improve the accuracy of recognition, it is necessary to supervise and control the data by means of fuzzy recognition, so as to complete the collection of image characteristic information and the management of special information output, and ensure the recognition and management with standard data, so as to effectively enhance the characteristics of the image stored in the network and database. The effect of levying category management. Especially for images with high similarity, it should be combined with fuzzy recognition process to sort, to improve the timeliness level of feature analogy to some extent, and provide intuitive data for application management;

4) Neural network recognition, which is more elaborate, mainly uses error back propagation mechanism to centralize proofreading and management of learning links, and uses self-learning and self-recognition effect to complete information proofreading, effectively implement the sample image input process and improve the information management effect according to the learning imitation process [2].

2. Application of Network Image Monitoring System Based on Image Processing and Pattern Recognition

2.1 Application of Image Processing in Network Image Monitoring System

In order to improve the application efficiency of image monitoring system and rationally implement the process of image processing technology, we can effectively construct a complete analysis framework system and ensure that the application foundation can be consolidated. Image processing technology mainly completes the color adjustment experiment to ensure that the application effect of image monitoring can meet expectations. In general, the color adjustment is mainly to adjust and contrast the image gray scale, which can effectively improve the clarity of the image and ensure the stability of the data display. This requires people to adjust the color of the image. The common control of color enhancement and color reduction is completed, and the corresponding analysis mode is improved [3].

On the one hand, the statistics of the gray value of the image are to be performed, and the feature

points of the image are effectively adjusted by the process of image processing. The rationality and completeness of the analysis data are guaranteed, and the rationality and validity of the analysis results are improved by means of corresponding analysis tools.

On the other hand, the gray level of the processed image should be calculated, and the integrity of the corresponding information application and management should be guaranteed, so as to truly obtain valuable data information, so as to complete the data collection and collation control.

After completing the corresponding operation, we should use the gray value adjustment control system to improve the application parameters of the overall structure of the picture, and ensure that the basic points such as brightness can meet the application requirements of the picture. In summary, after applying the grayscale adjustment mode, the degree of integration between image processing technology and image monitoring system can be further improved, which provides a good guarantee for the optimization and transformation of the accuracy and reliability of the network image monitoring system to some extent [4].

2.2 Application of Pattern Recognition in Network Image Monitoring System

The application of pattern recognition technology in network image monitoring system mainly relies on Bayesian classifier, which is the main tool to analyze the application of pattern recognition technology in image monitoring system. It can effectively classify the function values of image data, rationally supervise the corresponding data patterns and maintain the comprehensive value of data application management. The most important point is that in the process of constraining the conditional function probability and setting the judgment function comparative analysis method, the result is also pre-judgized, so that the accuracy of the network image feature classification can be improved by combining the analysis results. At the same time, pattern recognition technology can play its practical value in image analysis and monitoring to ensure accurate performance is optimized.

In addition, applying the pattern recognition technology to the network image monitoring system can also effectively increase the percentage of information extraction of the selected data. Before the recognition process, the percentage of information extracted in the image is generally about 50%, and after information image processing and pattern recognition, the information extraction percentage can be increased to 95%. Based on this, the application of Bayesian classifier can significantly improve the accuracy of information and image data extraction [5].

3. Experimental Analysis

Based on the above analysis, the image recognition technology and pattern recognition technology are effectively applied in the network image monitoring system, which can improve the comprehensive level and application effect of the corresponding work from the theoretical level. The article uses the corresponding experimental analysis to determine the effectiveness value of the corresponding work.

3.1 Image processing Technology for Color Adjustment Experiment

The common image color adjustment is to use corresponding tools to complete the gray level adjustment of the image, so as to ensure that the color of the original image can show a more effective increase or weaken, to ensure that the image can show a clearer state, but also effectively improve the stability of the data display process. Therefore, the basic sample image input in the system is selected, and the gray value thereof is adjusted to observe the change that the image can produce.

First, the original image is subjected to statistical calculation of the gray value, and the information of the data is initially determined. Generally, the levels are marked as j=0, 1, 2, 3, ..., k, ..., L-1. This is used as the basis for the analysis of the grayscale numerical pixel level. At the same time, the histogram of the image is read by the frequency cumulative distribution function, and the specific gray level of the image is effectively calculated. After completing the data statistics, we can use the gray level comparison before and after processing to determine the more appropriate

gray level of the image, and then complete the corresponding adjustment according to the standardized parameters and application points to ensure that the image is presented in the best gray level [6].

Secondly, with the help of gray level statistics, the corresponding gray level statistics histogram can be obtained. See Figure 1:

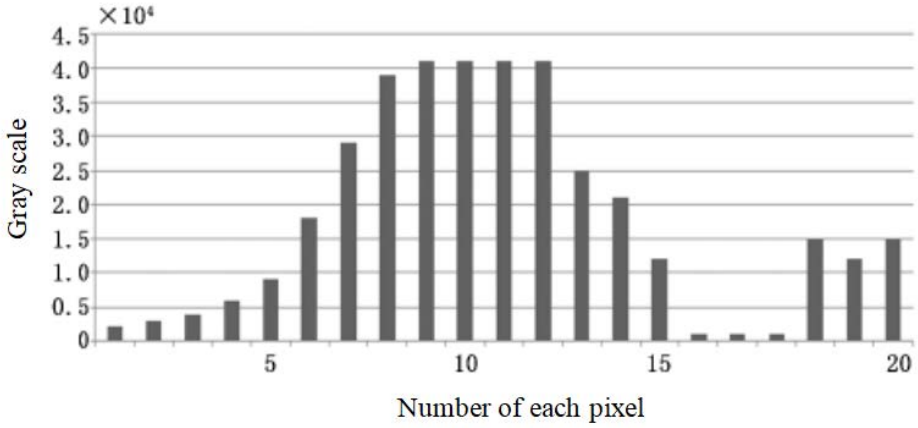

Fig.1. Histogram of statistical analysis of gray levels of each pixel in the original image

Third, after performing grayscale adjustment, the histogram obtained is shown in Figure 2:

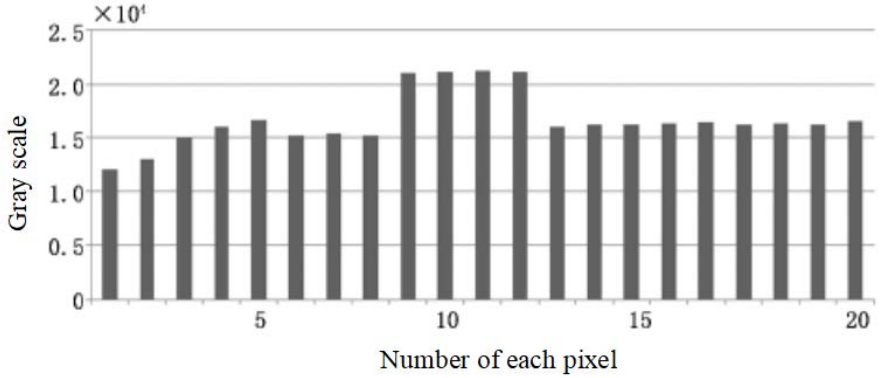

Fig.2. Histogram of statistical analysis of gray levels of each pixel in the processed image

Fourth, combining the gray levels of different pixels in the image, it is known that effectively averaging the image can improve the sharpness and resolution of the image, so that the image presents an optimal state. It is with the help of image analysis that the shadows and image structure can be perfected and adjusted rationally, and the gray value can be judged to improve the overall brightness after adjustment. It can also complete the extraction, resolution and processing of the internal features and basic information of the image, and effectively optimize the integrity of the information.

To sum up, in the network image monitoring system, image processing technology can be used to further refine the analysis and interpretation of the image to ensure that the basic requirements of the monitoring work can be completed. And the image can be restored and processed to ensure that the internal information of the image can be improved, thereby improving the reliability of the network image monitoring project [7].

3.2 Correspondence Analysis Experiment of Pattern Recognition

The Bayesian classifier is mainly used to compare the conditional probability and the set discriminant function, so as to obtain the data classification results.

First, we need to collect the basic samples as function patterns, and reflect them into Bayesian classifier, and use the method of function extremum analysis to complete the comparative analysis of data. Effectively use sample data and standard data to integrate information to ensure that the mean and oblique array values can be calculated to obtain the underlying pattern of the sample.

Secondly, the boundary of the data points should be divided according to the projection direction to ensure that the corresponding functions can be accurately classified and processed, so that the accuracy of image analysis and monitoring is improved to some extent.

Thirdly, the experimental results of different images should be compared and analyzed. It can be seen that the percentage of extracted image after processing is higher than that of original image. For example, the percentage of original night map information extraction is 32%, after pattern recognition, the percentage of image information extraction can reach 86%, effectively increased by 62% [8].

4. Conclusion

In short, in order to fundamentally improve the application efficiency of the network image monitoring system, it is necessary to rationally construct a complete image processing technology system and pattern recognition application framework. Thereby perfecting the technical application process, ensuring more accurate and useful results, promoting the overall progress and development of network monitoring projects, and laying a solid foundation for upgrading management.

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