

Face Recognition and Registration Research Based on the Floating Population

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Abstract: To build a peaceful city has become an important topic of the international community. As we all know, the human biological features are unique, stable, and safe to use, reliable. Then how would the success of biometric recognition technology be applied to existing security systems, and integrate a set of mature and complete application system? In this paper, based on face recognition of a certain station dispatched monitoring solutions, for example, describes how to use the security system in urban areas face recognition system.

Keywords: face recognition; security architecture; floating population; registration; super image reconstruction

1 Introduction

“Green City” system engineering, which will involve a large number of monitoring and alarm points, build as much as its integrated products and include the breadth of sectors, is really unprecedented. Coupled with China’s large population, vast territory, criminals, strong liquidity, the situation is more complicated. It must be the role of intelligent software systems and integrate high-quality hardware to form a practical and efficient management platform and practical solutions. Fang be able to give full play to its potential usefulness to achieve more with less purpose. Industry insider pointed out: “Now the Chinese security industry is no shortage of security equipment; missing is the overall solution^[1].”

2 Face Recognition Methods and Features

Biometric technology, which scientists around the world have experienced decades of painstaking study and improve, has matured, and gradually took to the stage of security community to continuously play its important role. Experts Forecast: by 2008, China’s biometric identification technology market space will increase to several billion dollars. Therefore, the correct and efficient use of biometric technology, in particular, face recognition technology, will be able to existing security monitoring systems draw on the city add the finishing touch, and to build a “harmonious society” has made indelible contributions^[2].

In recognition technology, the early features of face recognition technology uses face, neural networks and other methods require a lot of training samples for training. A face recognition method based on geometric features the use of people’s eyes, nose, mouth and other parts of the shape or type as well as the geometric relationship between them to do identification. This approach identified faster, but the recognition rate is low,

and often requires manual intervention to determine the eyes, chin and other locations^[3].

Compared to other biometrics, face recognition technology, the advantage is obvious. First of all, as identifying characteristics, face with a stable, reliable, safe, convenient and so on. Under normal circumstances, the person’s facial features are very stable and reliable, “carry” convenience. Surface, as is also the primary characteristic used to distinguish people. Because of this, in the police, security services investigation, in security, access control, the portrait is widely used. Secondly, the collection of face images is very convenient, especially standards-based video-image acquisition mode. At present, most security systems are used within the scope of the standard visible light camera, fully meet the human face image acquisition request, do not need any modified or upgraded. Face image capture non-contact type and does not need people to come forward with to maximize the system response speed. Third, security system combines the performance of face recognition systems can play the biggest advantages of the existing monitoring system can really reach the “prevention-Record-Evidence” objective. We know that most concerned about the current security system or surveillance scene, especially focusing on people and their behavior. This concern is often “hidden” and “non-invasive type”, and can not be specialized intervention^[4].

3 Face Recognition Based on the Floating Population

Using face detection technology can quickly analyze the location of the human scene, collecting the person’s facial image. Using face recognition technology, you can quickly analyze these images with a database of “suspects”, a dangerous person and to compare pairs of investigation. Once hit, the system will quickly respond. Face recognition systems capture human face images

with can be used as a very important monitoring data record is stored in the monitoring database, as a post-search index, or with public security, security sector database access, for evidence, finds. From this perspective, if the current security system the “record” no “defense”, then the application of face recognition systems, will give a pair of security systems, “eye”, detection, identification of people in the scene, so that can “prevent,” can “record”, can “check” to meet the airport, customs, treasury and other important occasions, the security task ^[5].

In this paper, super-resolution image matching methods of face recognition. The Face Recognition Technology in a complex background includes more than face real-time detection algorithms, facial feature extraction and identification of characteristics of the screening, as well as feature-level statistical recognition decision, for light, gesture, facial expressions, age, decorative even camouflage, scene, image sources with a strong adaptability and robustness. **Figure 1** shows the processing flow chart of face recognition technology.

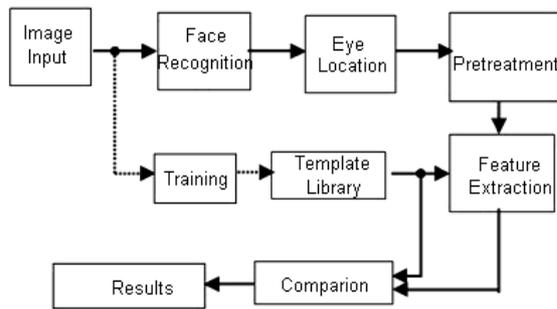


Figure 1. Technical processing flow chart of face recognition

The technology uses the properties of topological map to represent the human face, either a vertex topological graph contains a feature vector, used to record human face in the near of information. This approach combines the grayscale characteristics and geometry than that allowing the image to the existence of elastic deformation, in overcoming the effects of expression change on the recognition received good results. At the same time for a single person will no longer require multiple samples for training ^[6].

4 Case Analysis

Here we have a domestic in a city train station monitoring center system for example, analysis of face recognition system in the city in the successful application of security monitoring.

4.1 Case Background

A city train station is located in an important geographi-

cal position, the verge of a number of downtown commercial districts, station traffic inside and outside the larger molecules are more mobile committing the crime, often various types of criminal cases. Pedestrians access to stations in the various types of special populations in hiding. When there is a need for staff to identify, prevent, how accurately and efficiently to find that they have become a police station, the security sector are eager to solve the problem

According to the majority of the current domestic railway station and out of models of station management processes, train station stops of the mouth, outbound port, ticket is someone on duty location, but visitors must pass through. Also in these areas the speed will slow the flow of visitors because each visitor will be during this time is the camera shot. When there are special populations to find the task occurs, these locations will be the public security, the security sector is most concerned about the location. Typically, the relevant departments in the entry and exit ports and outlets are to install video surveillance equipment, the use of the special nature of these sites is to layout and implementation of information networks is to collect passenger information to identify the face recognition. But the manual search and comparison has many limitations, such as: people's memory is limited, often not clearly remember the short-term exposure of the object's facial features; can not simultaneously recognize multiple objects; can not long maintain the attention and recognition force and so on. Therefore, the existing security system in the role of such applications is very limited, and the relevant departments of the urgent need for the introduction of face recognition technology, to improve the efficiency and effectiveness of safety precautions ^[7].

4.2 Design and Features

Combination of previously described comparison of various types of biometric identification technology, and case background needs analysis, we choose as a face recognition feature. Primarily due to:

- Intuitive, natural. In this case, security staff members also used the manual to identify as the characteristics of human face using face recognition technology, the most in line with security personnel working habits.
- Cost. In this case, the relevant departments have been installed at various key locations the video recording system. Customers want to be able to transform the system as small as possible and low cost. Fingerprints, palm prints, iris and other means of identification for the need to install a new acquisition system, you must re-wiring, installation, FBI, etc., heavy workload and high cost. The front-end face recognition system can fully leverage existing security system in the camera, only need to configure a single back-end server than the human face, the workload is small, and low cost ^[8].

4.3 Architecture

The entire system architecture is shown in **Figure 2**. In the traditional video surveillance system on top, we passed a video camera divider will be collected to monitor video transported to the sea Xin facial feature extractor, the complete human face detection, storage, record, will face images LAN submitted to the human face than on the server, and various types of special populations database comparison. Real-time comparison of the results will be displayed in the portrait than the right display. Once officers hit, the system will trigger the control room of voice alarm systems, and compared the results to write the system log. Meanwhile, in the remaining room, can be photos of the suspect object input into the monitoring database, and submit to the human face than on the server for real-time comparison, when hit, can be recognized directly by the relevant staff.

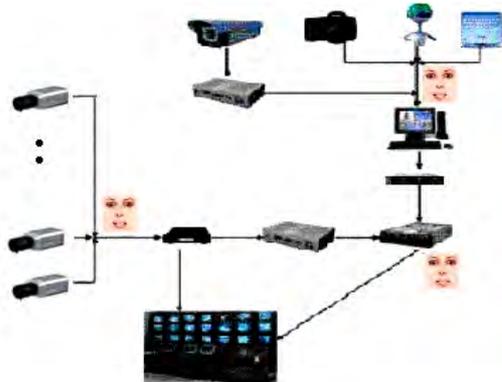


Figure 2. Face Recognition program station dispatched a monitoring plan

5 Conclusions

Automatic face recognition system solutions for information technology, communications technology and the

development of biometric technology products, but also is based on the “Green City” building in realization of effective measures for the management of safety precautions. Haixin automatic face recognition system in use, based on human face as the inherent physical characteristics, using image processing techniques and pattern recognition methods to achieve the purpose of identification or authentication. The system uses the world’s leading recognition algorithm for large surfaces such as photos and related information in the database of high accuracy, high-speed authentication with fast, high precision and strong adaptability to the environment and so on.

Because of its safety, wide range of applications, easy use and management, has been applied to the customs, airports, financial institutions, hotels, campus, high-grade office buildings, intelligent residential high-security requirements of the important place. The system has become a new generation of biometric security to prevent access to important sign of the field.

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