

# The Application Of Face Recognition Technology

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**Abstract.** The emergence of face recognition technology is a rapid progress in recent years with modern achievements such as computer technology, image processing technology and pattern recognition technology. It is a new biometric identification technology. The application of this technology in urban security protection has greatly improved our practical effect in daily security work. This paper presents a combination of face recognition and video monitoring technique. And the application of this technique is described in detail.

**Keywords:** Face recognition technology, Application patterns, Peaceful city

## Introduction.

Nowadays, China's social economy develops rapidly. The construction of "peaceful city" and the G20 financial summit have been held successively. This gives our city a growing security problem. In order to hit the national separatism and terrorist attacks at home and abroad, dealing with all kinds of economic crime, protect national and people's life and property security, ensure all walks of life and the normal operation of city key department, using high-tech security technology to prevent and stop the crime has become the urgent need of city construction safe and sound[1].

Some departments such as Banks, public security and government agencies currently use digital surveillance systems, which only have general surveillance and recording functions. Most of them are single-machine operation, video data is not easy to read, and cannot be centralized for management and maintenance. It is also difficult to accurately grasp the facial features of the monitored objects. This can lead to delays in tracking down the work. The most important thing is that the existing massive video data lacks intelligent and fast retrieval methods, so that the monitoring system cannot meet the user's higher requirements. With the popularization of computer application, network communication technology and the rapid development of image compression processing technology, combined with the latest biometric identification technology, can provide more security for "peaceful city" construction, advanced high-tech security solutions.

## Face Recognition Technology

### Noun Explanation

1) Face detection: It detects the presence of a face from a variety of different scenarios and determines its location. In most cases, the location of a human face is not known in advance because the scene is more complex. So first you have to determine whether there are faces in the scene. If there is a face, we can determine the position of the face in the image. Facial hair, cosmetics, lighting, noise, facial slanting and facial size changes and various occlusion are

complicating the problem of face detection. The main purpose of face detection is to look for faces in the whole image of the input. The image is divided into two parts: the face region and the non-face region. The system automatically extracts the face, so as to prepare for the subsequent application.

2) Facial representation: A representation of a known human face in a human face and a database. The usual notations include geometric features (such as Euclidean distance, curvature, Angle), algebraic characteristics (such as matrix eigenvectors), fixed feature templates, feature faces, and cloud patterns.

3) Face recognition: We can obtain relevant information by comparing the detected face with the known face in the database. At the core of this process is the selection of appropriate facial representation and matching strategies. The structure of the system is closely related to the representation of human face. It is usually a global approach or a feature-based approach to match. Obviously, there is a big difference between the features selected on the side and the features based on the positive image.

A complete face recognition system usually includes three main steps: face detection and tracking, feature extraction and selection, classification discrimination. Face recognition technology has 1:1 recognition and 1: N recognition of two application modes[2].

### **Face To Confirm**

The system validates the identity of the identified object and finally gets the conclusion such as "Yes/No". This is an application like "1:1". Access control system is a typical confirmation application.

### **Face Recognition**

Face recognition refers to identifying the identity of an object in a set of people. Answer the Problem such as "who are you?", the identification system gives a queue in the template library. It is arranged according to the video data or photograph of the identified object, and the degree of similarity is arranged from high to low. For example, 10 or 50, if the identification object belongs to this queue, it will be more successful. Identification of the identity of an object requires human involvement. This is an application of "1: N". The public security photo comparison system belongs to this application mode.

### **The Combination Of Face Recognition And Video Monitoring**

In all biometric identification technologies, the easiest to combine with traditional video monitoring technology is face recognition technology. Modern society is a densely populated and highly complex society. The range of human activities is increasing. In China, with the development of towns, the proportion of floating population has greatly increased. Emergencies and anomalies in cities are also becoming more complex. The difficulty and importance of city monitoring are becoming more and more prominent. Manpower is increasingly difficult to analyze and understand the demands of a large number of camera data collected. With the development of electronic technology, the monitoring hardware devices entered the digital age.

However, these monitoring systems do not have real-time, intelligent automatic analysis function. One way to do this is to use a camera to regularly record the scene of the monitored target area for a period of time. When an event occurs, the recording media that occurs as an event is called to carry out the event playback. Such monitoring cannot analyze and react to emergencies.

Their role is to provide information that can be traced back after the fact. Another way to do this is to still use the analog age monitoring method, which is manually monitored by security guards in front of the monitor. The shortcomings of this approach are obvious, and when the number of cameras used exceeds the number of monitors, the entire scene cannot be continuously monitored. In addition, due to fatigue and lack of concentration, the use of artificial monitoring can seriously affect the effect of surveillance. At the same time, human memory is limited. Statistics show that the average person can remember up to 600 objects in their lifetime. It is almost impossible for humans to make real-time video recognition of numerous surveillance objects. A PC server can remember and handle more than a million faces in 10.2 seconds. Therefore, the research and application of monitoring network with intelligent analysis and identification function is a development direction in the future.

Intelligent monitoring network system is different from previous monitoring technology. It's main feature is without requiring human monitoring, through multiple camera on a such as buildings, ports and other places of a wide range of important, for the special character, important events which happen, for 24 hours a day, automatic, real-time monitoring. This intelligent video monitoring system based on pattern recognition, through advanced artificial intelligence algorithm and pattern recognition technology, automatically analyzes events and characters in the surveillance scene. Target tracking control of the system through the camera, especially in the face and other biometric identity of the characters of real-time recognition, tracking and behavior analysis, through wired or wireless network transmission, will analyze the results sent to the control center. This allows for all-day, automatic, real-time monitoring of exceptional situations in important places, so that the security control center can respond quickly to exceptional situations.

Security monitoring is mainly about people. Face recognition based monitoring network is a new generation of highly intelligent security monitoring means. This technology has important research significance and the application prospect of wide importance. For example, for certain sensitive sites, such as bank, military bases, such as national important department, due to the need of the management and security, the people in the region must know certain people or events may happen. This requires a specific method to monitor the scenario so that an appropriate response to an unexpected event occurs in time. The technology could also be applied to more extensive venues such as rail transit exits, highways, parking lots, airports and other public places. Because the technology combines character recognition and intelligent video real-time monitoring technology, the tracking and monitoring of specific characters in a wide range of places can be realized. Nowadays, all countries in the world attaches great importance to national security and public security problem, namely how to city important department of stream of people and sensitive to the public for all-day, automatic and real-time monitoring.

### **Latest Research Findings**

At present, face recognition technology is divided into two categories: two-dimensional face recognition and three-dimensional face recognition. Two-dimensional face recognition is based on face plane image. Actually the face itself is three-dimensional. A face plane image is a projection of a three-dimensional face onto a plane. In the process, certain information is lost. Therefore, the further enhancement of the performance of two-dimensional face recognition has been adversely affected by ambient light, attitude, expression and other factors. Three-dimensional face recognition is based on three-dimensional face images. In theory, it has some advantages of three-dimensional image information. However, it has always been expensive to collect equipment, the collection

system is complex, the storage is high, the face reconstruction algorithm is complex, and the recognition speed is slow and so on.

The latest facial recognition system has the ability of storage function, high throughput, strong dynamic capturing ability, and the fastest reaction speed is only 0.01 seconds and so on. It is portable and highly automated. The technology is more mature in reducing the rate of false recognition and false rejection. Because the system USES the recognition technology of human bones, it is difficult to cover its eyes even if it is easily modified[3].

### **The System Characteristics**

This system pioneered the seamless integration of face recognition and monitoring and monitoring, real-time access to video in real time when the alarm process was processed, and the video review could be played back after processing.

The system has an elastic architecture. It can adapt to the networked, remote and arbitrary scale of the control system;

The diversity of the control photo source adopts different processing techniques, which overcomes the technical difficulties in dynamic face recognition with low recognition rate.

The multi-level control setting in the system solves the problem of the control management of different attention levels.

From video, the face is extracted from the frame by frame, and the alarm accuracy of the system is greatly improved.

After the fact, the human face comparison technology was used to retrieve the personnel, completely free the manual reading video playback time and hard work.

### **Face Recognition Technology Application Field**

Biometric identification technology is the use of the human body itself inherent physical characteristics (such as fingerprint, palmprint, iris, retina, face, DNA, etc.) and behavioral characteristics (such as handwriting, sound, keystroke), the techniques of image processing or other digital signal processing techniques and pattern recognition are used to identify the technology of identity. It has unique, stable, non-replicable and uncounterfeited characteristics, which are more secure than traditional methods[4].

In recent years, technology and products with biometric identification technology have developed rapidly. Internationally, western governments are vigorously promoting the development and application of biometric identification technology. After “911”, the U.S. government signed three more national security bills, requiring biometric technology. London began as early as 1999 in the city installed 290 important parts of the face recognition function of surveillance cameras, its strong function and great deterrent to criminal act soon, the streets of London that ratings was reduced by 30%. On July 7, 2005, there was a terrorist explosion on the London underground, killing more than 700 people on the spot. The police used data from tens of thousands of smart surveillance devices throughout the city. The face of the attacker was released shortly after the attack. On the fourth day, the police cracked down on the perpetrators and effectively cracked down on the arrogance of the terrorists.

Face recognition is the basic function of human vision system and is also the most direct way to recognize each other. Therefore, it is an important research content in biometric identification. Compared with other biological features, it has unique advantages in usability, including: it can be operated in a covert way, which is suitable for security, monitoring and grasping, etc. It adopts non

- contact signal acquisition, no aggression, no damage, easy to be accepted by people; It has low equipment costs; And have the advantage of intuitive and interactive. Therefore, face recognition has broad potential application prospects in security, business, finance, human-computer interaction and other fields[5].

## Conclusions

Face recognition technology has been applied in some provinces and cities in China. The results have been remarkable. It will also play an important role in future urban surveillance. And it will make a unique contribution to the construction of Peaceful city and creating a harmonious society.

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