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Technical Requirements for Face Identification of Video Surveillance in Security Systems

安全防范

视频监控人脸识别系统技术要求

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1 Scope

This Standard specifies the basic composition, functional requirements, performance requirements and test methods of face recognition of video surveillance in security systems.

This Standard is applicable to the scheme design, project acceptance inspection and relevant product development of face recognition of video surveillance for the purpose of security precautions. The face recognition of video surveillance in other fields may also take this as a reference.

2 Normative References

The following documents are indispensable to the application of this document. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 25724-2010 Technical Specification of Surveillance Video and Audio Coding

GA/T 893 Terms for Biometric Recognition in Security and Protection Systems

GA/T 922.2-2011 Face Recognition Application for Security and Protection Systems - Part 2: Face Image Data

ITU-T H.264 SERIES H: Audiovisual and Multimedia Systems, Infrastructure of Audiovisual Services - Coding of Moving Video - Advanced Video Coding for Generic Audiovisual Services

3 Terms and Definitions

What is defined in GA/T 893, and the following terms and definitions are applicable to this document.

3.1 Video Surveillance

Video surveillance refers to a means of using video technology to surveille and record the target.

3.11 Miss Alert of Watch List

When performing passage test on the test subjects on the watch list, if the system fails to correctly alert during the whole process, then, it is a miss alert of watch list.

3.12 Miss Alert Rate of Watch List

Miss alert rate of watch list refers to the ratio of the total number of passage tests with miss alert of watch list to the total number of passage tests of the test subjects already on the watch list.

3.13 False Alert of Non-watch List

When performing passage test on test subjects that are not on the watch list, if the system alerts, then, it is a false alert of non-watch list.

3.14 False Alert Rate of Non-watch List

False alert rate of non-watch list refers to the ratio of the total number of passage tests with false alert of non-watch list to the total number of passage tests of the test subjects not included in the watch list.

3.15 Response Time

Response time refers to the time interval from the moment that the test subject enters the recognition region to the first alert issued by the system in the passage test where an alert is generated.

4 Basic Structure of System

The video surveillance face recognition system in the security protection field (hereinafter referred to as the system) is composed of two parts: registration and recognition. The registration part is mainly composed of the face registration unit, as it is shown in Figure 1 a); the recognition part is mainly composed of three parts: the face image acquisition unit, the face comparison unit and the result analysis unit, as it is shown in Figure 1 b).

main area of the face, the system shall detect the location of the face and obtain the face image.

5.3 Face Comparison

The system shall be able to extract face feature from the acquired face image and compare it with the face feature of all targets on the watch list to generate a similarity value.

5.4 Result Analysis

The system shall be able to analyze the similarity value generated by face comparison and output an alert message in accordance with the set threshold.

5.5 Alert Output

5.5.1 In accordance with the alert message, the system shall output the alert scene image, the scene face image, the target's face image on the corresponding watch list and the related information.

5.5.2 The system should output the similarity value between the scene face image and the target's face image on the watch list.

5.6 Watch List Management

5.6.1 The system shall have the functions of querying, adding, modifying and deleting the watch list.

5.6.2 The system shall have the functions of querying, adding, modifying and deleting the target's face image on the watch list and the related information.

5.7 Alert Record Management

5.7.1 The system shall be able to implement real-time recording of alert scene image marked with the location of the target's face, the target's face image on the corresponding watch list, and the related information, the similarity value and alert time. The alert time shall include: year, month, day, hour, minute and second; the year shall be in millennium notation.

5.7.2 The system shall have the functions of querying, conducting statistics on and exporting alert records.

5.8 Parameter Settings

5.8.1 The system shall have the function of setting the comparison threshold parameters.

5.8.2 The system shall have the function of setting the maximum length of the target

7 Test Methods of System

7.1 Design Principle of Test

7.1.1 Before the test, a detailed test scheme shall be formulated. The test scheme shall be specified in terms of test environment design, test subject composition, test subject passage mode and test procedures to guide the test.

7.1.2 The passage mode of the test subject shall simulate the typical passage mode of the people using the system in the application scenario.

7.1.3 The test should adopt the mode of video recording, and the application field test may be supplemented. The format of the video recording should comply with the requirements of GB/T 25724-2010 or ITU-T H.264.

7.1.4 Under the circumstance of using video recording for tests, it shall be ensured that the playback speed of the video recording is the same as the recording speed.

7.1.5 When the mode of video recording cannot be used for tests, a test platform may be built in the same field environment, and the video source for multiple tests shall be consistent.

7.2 Functional Test Methods

7.2.1 Face registration

The test steps are as follows:

a) Select a face image that complies with the requirements of 4.1 in GA/T 922.2-2011 as the test image. Utilize the static face registration operation mode provided by the system to perform the registration operation. After this operation is completed, check the post-registration information directly from the database or by utilizing other modes provided by the system;

b) The tester shall remove all the ornaments that may obscure the main area of the face, stand in front of the camera used by the system and look at the camera lens. Adjust the focal length of the camera, so that the camera can focus on the tester’s face. In addition, ensure that the distance between the tester’s eyes in the video image collected by the camera is not lower than 60 pixels. Then, utilize the operation mode of collecting and registering face image data on the surveillance site provided by the system to collect a frame of video image as the test image and register it. After this operation is completed, check the post-registration information directly from the database or by utilizing other modes provided by the system;

c) Select a folder that contains more than one pieces of face image data that

comply with the requirements of 4.1 in GA/T 922.2-2011 as the test folder. Utilize the operation mode of importing and registering face image data in bulk provided by the system to register all face images in the test folder at one time. After this operation is completed, check the post-registration information directly from the database or by utilizing other modes provided by the system.

7.2.2 Face image acquisition

The test of the face image acquisition function shall be carried out in accordance with the following steps:

a) The tester shall remove all the ornaments that may obscure the main area of the face, stand in front of the camera used by the system and look at the camera lens. Adjust the focal length of the camera, so that the camera can focus on the tester's face. In addition, ensure that the distance between the tester's eyes in the video image collected by the camera is not lower than 60 pixels;

b) Initiate the face image acquisition function of the system; observe whether the system correctly marks the location of the tester's face in the real-time displayed video image or observe a screenshot of the tester's face image in the system.

7.2.3 Face comparison

The test of the face comparison function shall be carried out in accordance with the following steps:

a) Utilize the face registration function to register the tester's face image in the system database;

b) Set the comparison threshold to the value recommended by the system;

c) Conduct a passage test on testers who are already registered; check whether an alert message is output.

7.2.4 Result analysis

Persons who are not registered in the system shall be subject to the following passage test as testers:

a) After setting the comparison threshold to 0 in the system, perform a passage test; check whether an alert message is output;

b) After setting the comparison threshold to the recommended value in the system, perform a passage test; check whether no alert message is output.

7.2.5 Alert output

a) Utilize the operation mode of parameter setting provided by the system to set the comparison threshold parameter to 0; set the maximum length of the target list in the alert message to 1;

b) Utilize the face registration function to register more than one person's face images in the system database;

c) Perform a passage test on testers who are already registered; check whether the alert message contains the information of only one target person;

d) Set the maximum length of the target list in the alert message to 2;

e) Perform a passage test on testers who are already registered; check whether the alert message contains the information of two target persons;

f) Set the comparison threshold parameter to the value recommended by the system;

g) Perform a passage test on testers who are not registered; check whether no alert message is output.

7.2.9 User management

Utilize the operation mode of user management and authority management provided by the system to establish multiple users and set different authorities for the tester. After the tester logs in to the system as users with different authorities, check the operating authorization.

7.2.10 System log

The test of the system log function shall be carried out in accordance with the following steps:

a) The tester logs in to the system and performs more than one passage tests. After completing the passage tests, the tester shall log out from the system;

b) Utilize the operation mode provided by the system to check the system's running logs and operation logs;

c) Utilize the operation mode of querying and exporting running logs and operation logs provided by the system to respectively perform the operation of log querying and exporting. After each operation is completed, check the operation result.

7.3 Performance Test Methods

7.3.1 In accordance with the length of watch list supported by the system, the system performance test may be classified into 5 types. The length of watch list corresponding

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